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A. J. Wiley

HYDROELECTRIC PROJECT

FERC No. 2845 IDAHO

Final

Environmental Impact Statement

FERC/EIS-0031

FEDERAL ENERGY REGULATORY COMMISSION

September 1982

Final A.J. WILEY PROJECT - FERC NO. 2845 Idaho - September 1982

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FERC/EIS-0031

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ELECTRIC POWER REGULATION

Final Environmental Impact Statement

A.J. Wiley Project
FERC No. 2845-Idaho

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Applicant: Idaho Power Company
1220 Idaho Street
P.O. Box 70
Boise, Idaho 83721

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Division of Public Information
Federal Energy Regulatory Commission
825 North Capitol Street, NE.
Washington, D.C. 20426

September 1982

COVER SHEET

a. Title: A.J. Wiley Hydroelectric Project, FERC No. 2845--Idaho.

Application for FERC license to construct, operate, and maintain the proposed A.J. Wiley Hydroelectric Project

b. Final Environmental Impact Statement

c. Lead Agency: Federal Energy Regulatory Commission (FERC).

d. Abstract: The Idaho Power Company (Applicant) of Boise, Idaho, proposes to construct a hydroelectric project with an installed generating capacity of approximately 86 MW on the Snake River in Twin Falls and Gooding Counties, Idaho.

The proposed project would consist of: (1) Wiley Dam, a 680-foot-long, 100-foot-high, earth-filled embankment with an impervious core and rock surface, containing a 175-foot-wide, concrete, ogee spillway, located on the north abutment, and controlled by three 45-foot-wide and 35-foot-high Taintor gates; (2) a reservoir, which would extend to the tailwaters of the existing Lower Salmon and Lower Malad Powerplants of FERC Projects Nos. 2061 and 2726, respectively, with a gross storage capacity of 24,000 acre-feet and a surface area of 625 acres at elevation 2,735 mean sea level (msl); and (3) a concrete intake structure within the dam, south of the spillway, forming a monolithic structure, with: a reinforced concrete powerhouse located below the dam; a 13.8- to 138-kilovolt (kV), 3-phase transformer and switching structures, adjacent to to the powerhouse; and a 3-mile-long transmission line connecting the proposed powerhouse to the Applicant's existing transmission line, south of the project site. Applicant states that the Bliss Bridge and adjacent portions of Shoestring Road would be inundated by the proposed project. Applicant proposes to build a new bridge at a point 1,500 feet downstream of the proposed dam, and to reroute and reconstruct the inundated portions of the road.

e. Contact: Mr. Thomas N. Russo
Federal Energy Regulatory Commission
825 North Capitol Street, NE.
Washington, D.C. 20426
Telephone: (202) 376-9061

f. Transmittal: This final environmental impact statement, prepared by the Commission's Staff in connection with an application filed by Idaho Power Company for proposed project No. 2845, is being transmitted for your information on or about September 30, 1982, as required by the National Environment Policy Act of 1969 and FERC Order No. 415-C, issued December 11, 1972 (Appendix E).

FOREWORD

The Federal Energy Regulatory Commission (FERC), pursuant to the Federal Power Act (FP Act)* and the Department of Energy (DOE) Organization Act,** is authorized to issue licenses for terms up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary condition:

> (T)hat the project adopted . . . shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, and for other beneficial public uses, including recreational purposes . . .***

The Commission may require such other conditions not inconsistent with the provisions of the FP Act as may be found necessary to provide for the various public interests to be served by the Project.† Compliance with such conditions during the license period is required. Rule 206 of the Commission's Rules of Practice and Procedure allows any person objecting to a licensee's compliance or non-compliance with such conditions to file a complaint stating the basis for such objection for the Commission's consideration.††

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[*] 16 U.S.C. § 791 (a) - 825 (r)

[**] Public Law 95-91, 91 Stat. 556

[***] 16 U.S.C. Sec. 803(a)

[†] 16 U.S.C. Sec. 803(g)

[††] 18 C.F.R. Sec. 1.6

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SUMMARY

Idaho Power Company (Applicant) filed an application for a major license to construct and operate the proposed A.J. Wiley Hydroelectric Project, FERC No. 2845, on August 28, 1980. The application was amended on January 9, 1981, and supplemented on June 29 and October 5 and 29, 1981.

The proposed A.J. Wiley Project would be located on the Snake River near Bliss, Idaho, 85 miles southeast of Boise, Idaho. Project facilities would include an earth embankment dam having a crest length of 680 feet and rising 100 feet from the river bed to a crest elevation of 2,742 feet msl. The dam would create an 8-mile-long reservoir with a surface area of 625 acres and a capacity of 24,000 acre-feet of water. The reservoir would extend to the tailwaters of the existing Lower Salmon Falls and Lower Malad Powerplants, FERC Projects Nos. 2061 and 2726, respectively.

The powerhouse would contain three identical units with an installed capacity of approximately 86 megawatts (MW) and would have 70.5 MW of dependable capacity. Operated as a run-of-the-river plant, the proposed project would produce an estimated average annual net generation of 485 gigawatthours (GWh). Minimum and maximum net annual energy generation is estimated at 355 and 634 GWh, respectively.

Staff analyzed several alternatives to the proposed project, including the Bliss Bridge damsite, a coal-fired, steam-electric plant, and no action. The need for power analysis considered a range of annual growth rates between 2.7 and 4.0 percent for the planning period 1981 to 1991. The analysis indicated that the proposed project or any energy alternative could contribute 70.5 MW of dependable capacity to the Applicant's service area, but would not eliminate existing system reserve capacity deficits or the need for additional capacity. The analysis also indicated that large-scale development of the hydroelectric potential of the Wiley Reach with either the proposed A.J. Wiley Project or the Bliss Bridge alternative could defer the need for additional dependable capacity almost 1 year under a 2.7-percent annual load-growth scenario, and by one-half year assuming a 4.0-percent annual load-growth scenario.

During average streamflow years, surpluses in annual energy would occur in each year of the planning period under all energy growth-rate scenarios. Although the energy provided by the proposed A.J. Wiley Project or an energy alternate would not be needed during average streamflow years, it would be needed during adverse streamflow years, especially under the 3.5 and 4.0 percent annual growth-rate scenarios. Staff's analysis of the system energy requirements and resources under adverse streamflow conditions and average weather conditions showed energy deficits ranging between 195 and 836 GWh after 1989 under the higher growth-rate scenarios. Because of the increased demand for energy that would arise under adverse weather conditions, Staff believes that the magnitude of the deficits would be much greater, and that the deficits would occur prior to 1989.

The Bliss Bridge alternative is similar to the A.J. Wiley Project, except that the project would develop 96.3 percent of the available head in the Wiley Reach and the dam would be constructed 4,000 feet upstream of the proposed Wiley damsite. For purposes of analysis, the coal-fired, steam-electric plant alternative analyzed in this statement is hypothetically sited near Bliss, Idaho. Staff believes that other unidentified sites are available in and outside of Idaho that may be developed by the Applicant and neighboring utilities.

Staff's analysis of the geology of the proposed A.J. Wiley Damsite is based upon information provided by the Applicant, intervenors to this project, and geologic literature. Staff believes that a multi-line grout curtain would be required to reduce seepage and operate a safe project. Staff's economic analysis assumes worst-case geologic conditions and includes cost estimates to remedy these conditions and to operate a safe project.

The Bliss Bridge alternative would cost $13.9 million a year less to operate than the coal-fired plant alternative ($52.2 million) and the proposed A.J. Wiley Project would cost $12.1 million a year less than the coal-fired plant alternative. The Bliss Bridge alternative is more economical, partly because preliminary data indicate that the foundation problems at the Wiley damsite are not prevalent at the Bliss Bridge site. In addition, the environmental impact of the Bliss Bridge alternative is slightly less than that of the proposed project.

The Wiley Reach is a remnant of the historic free-flowing Snake River, which has undergone considerable development in the past 30 years for irrigation and power purposes. The important aspects of the Wiley Reach of the Snake River include regionally and nationally scarce and unique riparian flora, which is important habitat for wildlife in the area and for several candidate endangered and threatened species that are currently being reviewed for listing by the U.S. Fish and Wildlife Service (FWS). Staff notes that the FWS proposed to make recommendations for listing these candidate species this fall or will require that monitoring continue. The Wiley Reach has also been nominated as a candidate for inclusion in the National Natural Landmark Program and has been included in the Nationwide Rivers Inventory. Additionally, the Wiley Reach is one of the last fast-flowing reaches of the Upper Snake River basin in south-central Idaho, and provides diverse opportunities for river-oriented recreation. Approximately 4,956 users, mostly local residents, visited the Wiley Reach between May 15 and October 2, 1981, and took part in whitewater boating and sport fishing activities. The nearest river-oriented recreational opportunities comparable to the Wiley Reach are 150 miles from the general vicinity of Twin Falls and Gooding Counties, whereas the Wiley Reach is about 40 miles from the city of Twin Falls. Thus, the construction and operation of the proposed A.J. Wiley Project or Bliss Bridge alternative would eliminate the only large river resource in a 20-mile reach of the Snake River extending from Upper Salmon Falls Reservoir to Bliss Dam. Since additional power projects on the Snake River are under study and may be constructed in the future, the environmental resources and values that characterize the Wiley Reach would become more important in future years.

In contrast, the coal-fired plant site consists chiefly of rangeland and agricultural land. The predominant vegetation type of the rangeland is sagebrush-steppe, which provides habitat for small and medium-sized mammals and also provides hunting and offroad recreation vehicle use. Crops produced in the area include potatoes, corn, and wheat. Visual resources of the area have little definition and less variety than the Wiley Reach. The air quality at the site has been categorized as Class II-intermediate, although Craters of the Moon Monument and the Sawtooth Mountains Wilderness, located between 50 and 75 miles east of the proposed coal plant, are Class I areas with excellent air quality. Staff concludes that the environmental resources that characterize the Wiley Reach of the Snake River are of higher quality than those found at the coal-fired plant site, with the exception of the air quality.

Staff believes that there are environmental and economical advantages and disadvantages to the proposed action and alternatives. The proposed A.J. Wiley Project, while economically feasible and less costly than a coal-fired plant, would cost more to operate than the Bliss Bridge alternative. The A.J. Wiley Project is more expensive due to the additional costs of a multi-line grout curtain that would be required to reduce seepage at the damsite and operate a safe project. Although hydroelectric development provides inexpensive capacity, the energy produced under adverse streamflow and weather conditions would be lower than in an average streamflow year.

Even though the proposed A.J. Wiley Project and the Bliss Bridge alternative are more economical to operate and would provide for the complete development of the hydropower potential in the 20-mile reach of the Snake River between Upper Salmon Falls Reservoir and Bliss Dam, the selection of either would require the irretrievable and irreversible commitment of the only large non-reservoir resource in this river reach. Construction of the A.J. Wiley Project or the Bliss Bridge alternative would delay the need for a large energy-producing plant like the coal-fired, steam plant alternative for as much as 1 year. The coal plant is the only alternative analyzed that would have the potential to be expanded to meet electrical energy needs for more than 1 year. A single 250-MW unit could supply enough energy to defer the need for additional resources by several years. Barring any limitations caused by transmission facilities or environmental restrictions, additional units could be added to a coal plant as needed.

Unlike the hydroelectric projects, the energy production of a coal plant is not dependent on streamflow conditions; thus, the benefits of a coal-fired plant over a hydroelectric project during adverse streamflow years are obvious in terms of energy production. A hydroelectric project, however, has many distinct advantages over a coal-fired plant, and is far superior to a coal-fired plant in providing capacity to meet changing loads. Environmentally, a coal-fired plant would affect air quality and put pressure on community services and lifestyles during and after construction; it would allow, however, continued use of the only non-reservoir resource in the 20-mile reach of the Snake River between Upper Salmon Falls Reservoir and Bliss Dam.

The no-action alternative shifts the burden of providing electrical power to nonhydroelectric facilites, such as a coal-fired plant. Staff's analysis of other structural alternatives found them wanting in terms of providing dependable capacity and firm energy to the system over a period of at least 35 years, or found them not economically or environmentally feasible. Staff also viewed conservation as an adjunct to any project and not as a substitute to the proposed project. Staff believes that conservation has and will continue to play an important role in the service area, and will delay the need for additional generating resources, but not eliminate the need.

In summary, with the exception of air quality, the coal-fired, steam-electric plant alternative would adversely affect resources that are abundant and generally of lower quality than those found at the Wiley Reach of the Snake River. In contrast, the proposed project or the Bliss Bridge alternative would adversely affect resources in the Wiley Reach that are very limited and are of high value in terms of recreation, vegetation, wildlife habitat, scenic values, and fishery resources.

Of the options for large scale hydropower development of the 20-mile reach of the Snake River between Upper Salmon Falls Reservoir and Bliss Dam, Staff prefers the Bliss Bridge alternative and the accompanying mitigative measures outlined in Section 5.2, rather than the proposed A.J. Wiley Project.

The Applicant's fish and wildlife mitigative plan has undergone a review by the FWS and the Idaho Department of Fish and Game. These agencies have recommended various modifications to the original plan; these are included in Appendix C. Staff generally concurs with the agencies, and its' position is outlined in Section 5.2. The Applicant also reviewed the agencies' mitigative plan, and has been attempting to negotiate an agreement with the Idaho Department of Fish and Game to secure water rights to Banbury Springs in order to protect several populations of Shoshone sculpin. Staff supports these efforts.

The Applicant did not concur with all the points raised in the agencies' mitigative plan, but has expressed a willingness to work with the agencies to develop a mutually satisfactory plan. Staff believes that if the Bliss Bridge alternative is licensed, the Applicant should formulate a revised mitigative plan. The goals of the mitigative plan, methods to be used, species to be utilized, establishment of a monitoring system, and any contingency plans if efforts do not meet agreed-upon goals should be negotiated between the Applicant and the agencies.

Staff also believes that the Applicant and governmental agencies should consider the recommendations of Drs. Peter A. Bowler and Dwight W. Taylor with respect to various issues supported by Staff in Section 5.2.

The A.J. Wiley Project license application was made available for agency review and comment on May 29, 1981. A public scoping session was held in Gooding, Idaho, on July 28, 1981, to assist in identifying the significant issues for this environmental impact statement. Numerous letters of comment on the A.J. Wiley Project, the comments presented at the scoping session, and comments on the draft environmental impact statement and those subsequent to it have all been considered by the FERC staff in preparing this environmental impact statement.

Petitions to intervene regarding the pending license application have been granted to Idaho Department of Fish and Game, Idaho Park and Recreation Board, Idaho Whitewater Association, Friends of the Snake River, Dr. Peter A. Bowler, Mr. A.E. and Ms. Lilian Bowler, Dr. Harold Malde, Mr. K.A. Gronau, and Snake River Expeditions, Inc.

Section 1

PURPOSE OF AND NEED FOR ACTION

This section provides a brief description of the proposed action and a discussion of the need for and use of power under various assumptions of load growth, and includes the feasibility of various alternatives to the proposed action, such as power purchases, alternative design of the proposed action, a coal-fired steam-electric plant, a nuclear power plant, wind power, geothermal power, solar power, small hydroelectric power, and cogeneration. An economic comparison of the proposed action and the most reasonable alternatives is found at the end of this section. The economic analysis assumes "worst-case" geologic conditions and includes cost estimates to remedy those conditions.

1. PURPOSE OF AND NEED FOR ACTION

1.1 PURPOSE AND DESCRIPTION OF ACTION

The proposed action before the Federal Energy Regulatory Commission (FERC) is an application for license for the A.J. Wiley Project, FERC No. 2845, by the Idaho Power Company (Applicant) of Boise, Idaho, seeking authorization to construct a dam, a reservoir, and a powerhouse with a total installed capacity of approximately 86 MW.

The Applicant proposes to utilize power and energy developed by the A.J. Wiley Project to provide electrical service to its customers within the states of Idaho, Oregon, and Nevada. The project site is centrally located within the Applicant's service area. The A.J. Wiley Project is proposed as a part of the comprehensive development of the stretch of the Snake River that includes the following constructed projects: Lower Salmon Falls Project, just upstream from Wiley; Bliss Project, just downstream from Wiley, and the Upper and Lower Malad Projects, located on the Malad River, tributary to the Snake River, immediately upstream from the Wiley site.

1.1.1 Proposed Project Operation

The A.J. Wiley Project would utilize waters of the Snake River for power production. The Applicant proposes to utilize a maximum of 15,000 cubic feet per second (cfs) of water through the turbines for power generation. The Wiley Project would not involve a consumptive use of water, since all water would be returned to the river through the powerplant tailrace or spillways. The A.J. Wiley Project is proposed to operate as a run-of-the-river plant, with minimal daily and weekly reservoir fluctuations of 1 foot to provide for regulation of power output. The dependable capacity of the project would be 70.5 MW, which is the amount of capacity that can be relied upon to meet system loads during adverse streamflow conditions, considering the characteristics of the load to be supplied. The project would produce an average net annual generation of approximately 485 GWh.

The Wiley Reservoir would encroach on the existing Lower Salmon Falls and Lower Malad powerplants, as well as several small hydro powerplants, thus reducing the average operating heads at those plants. The encroachment from Wiley Reservoir would reduce the average power output at the Lower Salmon Falls Powerplant by about 1,000 kilowatts (kW), at the Lower Malad Powerplant by about 1,200 kW, and at the others by 185 kW. Discharges at Wiley could be governed almost entirely by the regulated releases from the reservoirs upstream, especially from the American Falls Reservoir. Table 1-1 shows estimates of the net annual energy in GWh that could be produced by the Wiley Project, as well as decreases in energy at other projects, based on average, maximum, and adverse streamflow conditions.

Table 1-1. Estimated net annual energy produced by Wiley project. 1/

	Annual energy (GWh)			
Condition	Wiley	Lower Salmon Falls 2/	Lower Malad 2/	Net, Wiley
Average for period	503.4	-8.2	-9.8	485.4
Maximum (1972)	653.7	-8.9	-10.1	634.3
Minimum (1935)	371.9	-7.4	-9.1	355.4

1/ Idaho Power Company, 1981b, Application.

2/ Reduced output because of Wiley Reservoir encroachment.

The Snake River above the Wiley Reach is extensively developed for irrigation, flood control, and hydroelectric power generation. All recorded discharge data used for power operation studies for A.J. Wiley were based on a 48-year record of average monthly discharges of water years 1928 through 1975, adjusted for the 1975 level of upstream storage development and irrigation depletions. Irrigation water would be diverted from the Snake River downstream of the Wiley site; thus irrigation diversions would be available for power generation at Wiley. Data for adverse streamflow conditions are based on the historical flow records for the period of July 1934 through June 1935, adjusted to the 1975 level of irrigation depletion.

1.2 NEED FOR POWER

1.2.1 Historical Energy Requirements

The Applicant is the largest utility in the state Idaho. Prior to 1974, Applicant had an all-hydroelectric generating system, with the exception of a small amount of combustion turbine capacity. In 1974, the addition of the Jim Bridger coal-fired, steam-electric Unit No. 1 by the joint owners (the Applicant and Pacific Power and Light Company) transformed the Applicant into a combination hydrothermal utility. In 1975, the Applicant's total installed generating capacity equaled 1,686 MW, with hydroelectric projects comprising 1,290-MW, steam-electric plants, 399 MW, and combustion turbine, 57 MW. These projects generated a total of 10,969 GWh in 1975. The Applicant reported 1975 sales of 7,554 GWh to ultimate customers and sales for resale of 2,958 GWh. No purchases were made from other utilities during 1975, but interchanges with other utilities resulted in a net receipt of 494 GWh by the Applicant. At the end of 1975, the Applicant supplied electric energy to approximately 204,000 ultimate customers.

By the end of 1980, the Applicant supplied 9,122 GWh of electric energy to approximately 250,000 ultimate customers in a 20,000-square mile area of southern Idaho, eastern Oregon, and northern Nevada (Idaho Power Company, 1981a). Approximately 94 percent of these customers are located in Idaho, mainly in the southwestern portion.

A percentage breakdown of the class of customers by numbers and total energy sales is shown in Table 1-2. As shown, irrigation and industrial customers accounted for only 5 percent of the customers, but made up one-half of the total energy sales. Although farm and residential customers far outnumber the other types of customers, they account for only 33 percent of the energy sales.

Table 1-2. Types and numbers of customers and energy sales in the Idaho Power Company service area. 1/

	Percentage based on	
Type of customer	Number of customers	Energy sales
Farm and residental	84	33
Irrigation	4	16
Commercial	11	17
Industrial	1	34
Street lighting	-	<1

1/ Idaho Power Company, 1981a.

Electric energy demand for irrigation pumping decreased by 15.4 percent in 1980, compared with 1979. The decrease was due to above-normal precipitation and cooler-than-normal summer temperatures that reduced the need for irrigation pumping. By contrast, during the relatively dry, hot irrigation season of 1979, demand for pumping energy increased 21.2 percent over the previous year. Acreage under pumped irrigation increased 2.6 percent during 1980, requiring 31,079 additional horsepower (approximately 23,300 kW) for pumping installations. The Applicant provided service for slightly more than 1.2 million pump horsepower in 1980 to irrigate more than 1.8 million acres of agricultural land.

In addition to supplying customers in its service area, the Applicant has "firm" long-term contracts to sell electricity to the Weiser Municipal Utility and to two other private utilities in Nevada and Oregon.

1.2.2 Present Energy Scenario

The Applicant's system peak occurs in the summer, usually late in June or early July, and is principally caused by irrigation loads. The Applicant's major problem in terms of matching resources with demand occurs when the peak demand coincides with low streamflows through the hydroelectric system. This problem is somewhat mitigated by load diversities between the Applicant and other Pacific Northwest utilities, enabling the Applicant to purchase some summer power and to exchange energy with utilities having winter peak loads.

During the winter of favorable water years, energy production at the Applicant's hydro plants increases, resulting in sales of surplus energy to other utilities in the Pacific Northwest. In 1980, such sales of energy to other utilities increased 36.9 percent over 1979. Since over 70 percent of the system generation historically has been derived from the Applicant's hydro plants, energy availability is a function of hydrologic conditions.

1.2.2.1 Existing Generating Resources

The Applicant owns 16 hydroelectric powerplants, and a combustion turbine plant, and shares ownership in two operating coal-fired generating plants and another under construction. The coal plants are located outside Idaho. The hydroelectric resources allow the Applicant to supply variations in loads within a given month with hydroelectric energy and to operate thermal units at nearly constant levels of output.

In 1980, the Applicant's 16 hydro plants on the Snake River and its tributaries had an aggregate 1,574.9 MW of installed capacity. Actual output of the hydro plants varies considerably depending on streamflows and reservoir levels (Table 1-3). The Applicant's installed thermal capacity of 788 MW consists of a one-third share (678.1 MW) of the Jim Bridger Plant in Wyoming, a one-tenth share (53 MW) of the Boardman Plant in Oregon, the 50-MW Wood River combustion turbine plant, and a 7-MW diesel unit. The last two resources are used for standby operations (Table 1-3). The Bridger and Boardman coal-fired plants have significant roles in the Pacific Northwest power network, and become critically important whenever drought reduces hydroelectric generation.

Table 1-3. Existing generating facilities and resources owned by Idaho Power Company, 1980. 1/

Hydro projects	Installed capacity or share (MW)	Actual annual generation (GWh)
Hells Canyon	391.5	2,280
Oxbow	190.0	1,106
Brownlee	585.4	2,769
Swan Falls	10.3	86
C.J. Strike	82.8	502
Bliss	75.0	411
Lower Salmon	60.0	283
Upper Salmon 1 & 2	18.0	147
Upper Salmon 3 & 4	16.5	133
Thousand Springs	8.8	62
Shoshone Falls	12.4	95
Twin Falls	8.4	65
American Falls	92.3	379
Lower Malad	13.5	121
Upper Malad	7.2	66
Clear Lake	2.5	18
Cascade	0.3	2
Total hydro	1,574.9	8,525
Thermal projects		
Boardman (coal)	53 2/	81 2/
Jim Bridger (coal)	678 3/	3,186
Wood River combustion turbine	50	4
Diesel standby	7	0
Total thermal	788	3,271
Total generating facilities	2,363	11,796

1/ Idaho Power Company, 1981a; and 1981, Application.
2/ 51 MW after calculated losses.
3/ 647 MW after calculated losses.

The Applicant's generating plants produced a total of 11.8 billion KWh of electricity in 1980. Of that total, 72 percent (or 8.5 billion KWh) came from hydroelectric plants (Table 1-3).

1.2.2.2 Purchased Power and Exchange Energy

Interchange energy is electric energy received by one electric utility system in exchange for energy delivered to the other system at another time or place. Interchange is to be distinguished from a direct purchase or sale, although energy balances accumulated under interchange agreements are sometimes settled for in cash.

In 1980, the Applicant delivered 663 GWh and received 840 GWh of interchange energy for a net receipt of 177 GWh. The Applicant has a firm peak entitlement by contract of 135 MW from the Washington Water Power Company in the summer and a 140-MW obligation to the same company in the winter. According to the Applicant, this contract is for an indefinite duration. The Applicant also has entitlements of firm power from the Bonneville Power Administration (BPA) during the usual time of the summer peak. These entitlements range between 83 and 94 MW, and would expire October 1986. Applicant also has firm power obligations to Washington Water Power Company, Utah Power and Light Company, and CP National, and is obligated to serve the Salmon area load. In 1980, net firm purchases of capacity were 45 MW during the summer (Idaho Power Company, 1981a).

1.2.3 Future Energy Resources

Based on analyses of projected electric demand, the Applicant has plans to construct and operate additional hydro and thermal plants by the year 1989 (Table 1-4).

FERC has issued licenses to construct and operate the Cascade, Lucky Peak, and North Fork Payette River Projects, which have installed capacities of 12.8, 79, and 273 MW, respectively. The license for the Lucky Peak project was issued to the Boise Board of Project Control; power from the project will be sold to the Applicant. In addition, the Applicant has applied for preliminary permits to study the feasibility of the Dike, Milner, and Kanaka Rapids Projects, located on the Snake River. These projects would have a total aggregate installed capacity of 240 MW.

Table 1-4. Future generating resources planned by Idaho Power Company. 1/

Name	Type	Installed capacity (MW)	Ownership %	Expected annual net generation (GWh)	Expected date of operation
Lucky Peak 2/	Hydro	87.5	100	282	June 1986
Cascade	Hydro	12.8	100	49.9	January 1984
North Fork Payette	Hydro	273	100	1,234.4	January 1986
Dike	Hydro	70	100	400.8	October 1986
Kanaka Rapids	Hydro	20	100	112	January 1987
Valmy 1	Coal-fired	250	50	766.5 3/	October 1981
Valmy 2	Coal-fired	250	50	766.5	1984 4/
Combustion turbine	Oil-fired	217	50	323 5/	June 1983
Coal plant 1	Coal-fired	250	50	766.5	January 1987
Coal plant 2	Coal-fired	250	50	766.5	January 1989
Small hydro	Hydro	80	100	420	December 1991

1/ Idaho Power Company, 1980b, 1980c.

2/ Total plant output to be sold to Applicant.

3/ Based on 70 percent plant factor.

4/ May be delayed until 1985.

5/ Based on 17 percent plant factor.

The Applicant has entered into a contract with the Sierra Pacific Power Company to participate in the North Valmy powerplant project, located in Valmy, Nevada. The Valmy Project consists of two 250-MW coal-fired units. The Applicant is entitled to 50 percent of the output of this plant. The first unit was scheduled to go into operation sometime in 1981; the second unit, scheduled for commercial operation in 1984, may be delayed until 1985, pending a court decision that would require the installation of flue gas desulfurization (FGD) equipment (Idaho Power Company, 1980c).

The Applicant is also proposing to participate in the construction of two 250-MW thermal units, designated Nos. 1 and 2, which would be shared equally with a neighboring utility. This plant has not been sited and might be located out of state or within Idaho. The first unit is proposed to begin operation as early as January 1987 (Idaho Power Company, 1980b).

The Applicant indicated that the 3.5-MW Tamarack Project would be available to serve load in 1983, as would unspecified additional congeneration and small power production totaling 15 MW by 1985, 35 MW by 1987, 55 MW by 1989, and 80 MW by 1991. Only the 3.5-MW Tamarack Project is considered to be firm at this time. (See also Section 1.2.5.)

In addition, the Applicant is planning to install 217 MW of combustion turbine capacity to be placed in service in mid-1983 in order to forestall an impending energy deficiency (Idaho Power Company, 1980b). While the Applicant acknowledges that baseload capacity would be a more economical way to provide the needed energy, it does not have sufficient time to add more baseload capacity.

1.2.4 Load-growth Forecast

Two of the most recent studies of the energy needs of the service area were released by the Applicant in February and October 1981. Using a new peak forecasting model, the Applicant considered variations in temperature and their effects on the summer and winter peak loads and energy. Factors considered in the model include population, employment, sales to residential, commercial, irrigation, and industrial customers, firm resale, and system losses. The assumptions regarding these factors for both studies are shown in Appendix A.

The base case load forecast released in February 1981 projects the Applicant's annual compound growth rate for 1981-2001 to be 3.6 percent per year. The growth rates for 1981-1991 and 1991-2001 are 4.0 and 3.2 percent per year, respectively (Idaho Power Company, 1981c). Given average weather conditions, the winter peak would slightly exceed the summer peak in 1989. As shown in Table 1-5, if winters are colder, the system peak would shift to a winter peak as early as 1982 (1 in 20 coldest winters).

Table 1-5. Idaho Power Company winter-summer peak crossover 1/ (load less chemical). 2/

	Average	Probability 1 in 4	Probability 1 in 10	Probability 1 in 20
Year	1989	1985	1983	1982
Winter peak (MW)	2,540	2,220	2,080	2,002
Summer peak (MW)	2,515	2,214	2,069	1,991

1/ Idaho Power Company, 1981c.

2/ Chemical includes FMC, Monsanto, ERDA, and Simplot corporations.

The analysis for summer months shows lesser variations in load because of smaller variations in temperature.

Applicant's October 1981 report on service area needs and resources was based on a lower load forecast and an analysis of potential new resources, including cogeneration and small power production. The Applicant assumed median water conditions in determining the resources available to meet system load. The sales forecast for the service area showed an average annual growth rate of 2.9 percent for the 1981-1991 period and 2.6 percent for the 1991-2002 period. This results in an average annual growth rate of 2.7 percent for the 1981-2002 period (Idaho Power Company, 1981d). Conservation effects are included in the forecast primarily through the elasticity effects of price increases, but Applicant-sponsored programs are not considered beyond 1985. Assuming average temperature conditions, Table 1-6 shows the summer peak demand from 1981-1991 and also the annual energy required during the planning period.

Table 1-6. Idaho Power Company total energy and peak load Forecast. 1/

Year	Annual energy (GWh)	Summer peak load (MW)	Annual energy (GWh)	Summer peak load (MW)
	4.0 percent		2.7 percent	
1981	11,546 2/	2,065 2/	11,506	2,117
1982	12,063	2,143	11,817	2,174
1983	12,658	2,229	12,136	2,233
1984	13,333	2,365	12,463	2,293
1985	13,858	2,387	12,800	2,355
1986	14,200	2,464	13,145	2,419
1987	14,831	2,544	13,500	2,484
1988	15,409	2,263	13,865	2,551
1989	15,978	2,701	14,239	2,620
1990	16,530	2,777	14,624	2,691
1991	17,063	2,852	15,019	2,763

1/ Idaho Power Company, 1981c; 1981d.

2/ Actual figures.

1.2.4.1 Effects of Conservation on Demand

Conservation offers an even more specific approach to eliminating (postponing) the need for additional peaking or base load capacity than merely shifting the load to offpeak hours, as with load management. It seeks to actually reduce kilowatts consumed by more efficient utilization of the ones used.

The IPUC has stated that conservation, cogeneration, and small power technologies are capable of making a substantial contribution to the energy needs of the state of Idaho.

The Applicant has long been aware of the economic benefits of energy conservation. The Applicant points to the fact that more than 20 years ago it established what were then the highest insulation standards in the Nation. These standards currently include use of attic, wall, and floor insulation, reduction of heat leaks by addition of storm doors and windows and weather stripping, low-flow shower heads, and more efficient motors and applicances. Implementation of these standards can involve major savings for a utility.

One of the most drastic approaches to ensure adequately insulated structures has been adopted by Pennsylvania Power and Light. In March 1981, the Pennsylvania Public Utility Commission approved a policy that says, in effect, that the company will not connect electric power to any home or business unless certain minimum insulation requirements are met. Also, the use of renewable energy sources such as solar, wind, and wood to supplement electricity use would not be restricted, but rather encouraged.

The importance of adequate residential home insulation and energy conservation is pointed up by considering that a new all-electric home requiring 10 kW for space heating and 4.5 kW for water heating will require (at $1,300 per kW) an investment of approximately $10,000 to $20,000 by the affected utility, depending on the load diversity among customers, so that even a 10-percent reduction is significant.

The Applicant submitted an application to the Idaho Public Utilities Commission (IPUC) for authority to implement a conservation program under which the company would finance the installation of insulation and other weatherization materials in the homes of qualified residential customers who use electricity for space heating, (Table 1-7).

During the last half of 1980, the Applicant hired independent contractors throughout its service area to insulate water heaters in as many customers' homes as posible by a door-to-door campaign. Under the direction of the customer service-energy management department, the program reached into more than 130,000 homes by the end of the year. It is estimated that more than 75 percent of the residential water heaters in the service area now are insulated and that the annual energy savings may approach 80 million kWh in future years. The Applicant also supplied its customers with insulating gaskets to prevent drafts through electric outlets and light switches, as well as flow restrictors to be placed in showerheads and faucets. The annual energy savings expected from use of the latter two devices, based on installation in 20 to 25 percent of electrically heated homes, is estimated to be 23 MWh.

Table 1-7. Idaho Power Company's 1980 conservation plan. 1/

Program		Estimated cost to Applicant	Estimated energy savings
(1)	Solar water heaters	Not reported	Not reported
(2a)	Electric water heater insulation jackets	$4,000,000	81,000 MWh/year
(2b)	Water heater thermostat set-backs	2/	2/
(3)	Electrical outlet gaskets	$460,000	48,000 MWh/year
(4)	Shower water flow-restrictors	$10,000-$20,000	48,000 MWh/year 3/
(5)	Whole house insulation	$11,400,000	76,000 MWh/year 4/

1/ Idaho Power Company, 1980d.

2/ Cost and energy savings reflected in program 2a.

3/ Energy savings depend on public acceptance.

4/ Initial costs reported.

Upon completion, the residential conservation program is projected to save the equivalent of 253,000 MWh of energy by 1985. The average conservation savings forecast up to 1981 is 191,800 MWh (George Anthony, public scoping session in Gooding, Idaho, July 28, 1981).

The IPUC recently approved the Idaho Power Company's plan for an energy-saving, fluorescent-lamp, rebate program for non-residential customers. The Applicant estimates that if 400,000 replacements are made, a saving of 50,400,000 kWh would be realized. This program began on April 15, 1982, on a first-come, first-served basis for the first 9 months, or until 400,000 lamps are replaced.

The Idaho Power Company has conducted irrigation pump-testing programs, but these tests were made to determine overall irrigation-system efficiency and were not limited to the pump itself. Staff is not aware that these tests have led to conclusions about the potential MW savings available in irrigation.

Although the current company-sponsored conservation programs are directly included in the short-run forecast, conservation estimates after 1985 are based on the impact of price increases. Therefore, in order to avoid counting conservation twice, the current company-sponsored conservation programs are not explicitly included in the forecast beyond 1985. The effects of conservation on demand have been incorporated into the load projections discussed in Section 1.2.5.

Conservation is not a viable alternative to the proposed project because it cannot be determined accurately how much load-growth reduction can be achieved within the time required to bring the proposed project on line. Conservation is an adjunct to the proposed project, not an alternative to it.

1.2.4.2 Effects of Pricing on Demand

The Applicant's authorized rate increases in 1980 resulted in more than $54 million in additional annual revenues. The Applicant was expected to file applications in 1981 for additional rate increases for both retail and wholesale service. Not withstanding these recent rate increases, however, Applicant's electric rates will remain below the national average (Table 1-8), primarily because a sizable portion of the Applicant's generation is produced from hydroelectric plants that were constructed years ago and financed at lower interest rates than are now available.

Table 1-8. Comparison of average electric rates of Idaho Power and other utilities (cents per kWh). 1/

	Idaho Power Company			Privately owned utilities 2/		
	1979	1980	1981	1979	1980	1981 3/
Residential sales	2.29	2.82	2.99	4.64	5.36	NA
Commercial sales	2.14	2.76	2.70	4.68	5.48	NA
Industrial sales	1.14	1.40	1.81	3.04	3.67	NA
Sales for resale	1.25	1.68	2.06	2.59	3.02	NA
Total sales	1.78	2.20	2.42	3.76	4.43	NA

1/ Idaho Power Company, 1980b.
2/ Class A and B electric utilities in the United States.
3/ Not available.

The present incremental busbar cost (the cost of electricity before transmission charges) of providing energy from new resources to meet growing demand is approximately 8.9 cents per kWh. (See Table 1-9.) At present, a 1 percent increase in generating resources will require an increase in electric rates of approximately 3 percent. The cost of adding additional distribution facilities would increase the rates even more. Since hydro plants require no fuel, the electric rates tend to increase more slowly on systems that have hydroelectric resources than on systems that have no hydroelectric generation.

Because of the presence of low-cost hydroelectric power, the Pacific Northwest Region has become heavily dependent on electricity. The region's per capita electric energy consumption is almost double the national average. The Applicant reported that the average annual electric energy consumption per residential customer during 1979 was approximately 15,200 kWh. In 1980, residential consumption dropped to 14,500 kWh per customer. The Applicant's residential usage figures are significantly higher than the national average, which in 1979 was 8,300 kWh per residential customer for class A and B privately owned electric utilities.

For the Idaho Power Company's load-forecasting study, inverted rates were assumed to occur in 1982 for the residential class. Inverted rates for other classes were not assumed at this time. In the small commercial sector, a change to a flat rate was assumed that resulted in marginal price increases similar to those found in the residential sector, because of the implementation of inverted rates.

The inverted rate structure ordered for the residential customers of Idaho Power Company by the IPUC in October 1981 was struck down by the Idaho legislature, thus forcing a return of flat rates. Under the new law, all inverted rate structures not in place before July 1, 1981, are banned for a period of 2 years, beginning July 1, 1982.

In the fall of 1980, the IPUC ordered Idaho Power Company (in addition to Washington Power) to initiate a $50-per-kW hookup surcharge for the portion of capacity devoted to electric space heating. In early 1982, the Idaho Supreme Court struck down the $50-per-kW surcharge on new electric-heat hookups. The court found that the new hookup charge created unreasonable differences in rates and charges among classes of customers.

Future electric rate increases depend on the rate-making policy of the IPUC. Staff believes that it is doubtful that rates comparable to the national average would become a reality in Idaho in the near future because rate-making policy usually requires that rates be based upon cost of service. Revised rates would encourage conservation, which in turn would reduce demand, but it is unlikely that revised rates would invalidate the need for the proposed project or other structural alternatives discussed in Section 1.3. The load forecasts discussed in Section 1.2.4 reflect the effects of pricing on future demand.

1.2.4.3 Load Management

The Applicant has interchange and emergency assistance agreements with adjacent systems for amounts of capacity and energy, depending upon available generating and transmission line capability. In addition, the Applicant has approximately 300 MW of interruptible industrial (chemical company) load that can be curtailed (Idaho Power Company, 1981a).

The Applicant has developed a curtailment plan that describes the steps to be taken if sufficient electrical energy is not available as a result of equipment failure, substantial peak demand, or inability to purchase power from sources outside the Applicant's system. This plan would sequentially reduce service to interruptible customers, industrial customers, commercial customers, and finally to residential customers.

1.2.5 System Generation Capabilities

Various terms are used to describe the capability of electric generating plants. Installed capacity is perhaps the most convenient, as it is constant, and represents the cumulative nameplate rating of all the generating units in the plant (Table 1-3). Installed capacity, however, has the shortcoming that it does not fully define a plant's ability to carry load.

For hydroelectric plants, two additional values are required to define a plant's ability to carry load--dependable output during adverse streamflow conditions, or primary energy. Dependable capacity for hydroelectric projects is usually defined as capacity that can be relied upon during adverse flow conditions, considering the characteristics of the load to be supplied. Since electric loads fluctuate on an hourly, daily, weekly, seasonal, and annual basis, it is not necessary for the maximum capacity of a hydroelectric plant to be continuously available. To be dependable, however, capacity must be available when required. Primary energy is directly proportional to streamflow during the adverse streamflow period that, for Idaho, is considered to be June 1934 through July 1935.

Idaho Power Company (1981c; 1981d) estimated that the average annual rate of load growth in its service area was 4.0 percent in February 1981 forecast and 2.7 percent in October 1981 forecast. Staff has illustrated the dependable capacity and the estimated annual energy during average and adverse streamflow conditions in relation to a range of growth rates between 2.7 and 4.0 percent (Figures 1-1, 1-2, 1-3, and Appendix A, Tables 1 to 6).

1.2.5.1 System Reserve Capacity

Reserve capacity is defined as the excess of generating capacity over the total demand within the service area. Reserve capacity permits the removal of generating capacity from service for periodic maintenance, provides additional power for unexpected system problems, and provides for uncertainty in predicting future electric power requirements. The amount of reserve capacity over time will be variable because added facilities provide step increases in generating capacity, while actual demand growth more nearly follows a continuous curve.

Normally, additional capacity is required above the summer peak load in case of forced outages. For example, if the system reserve capacity required in a given year is 20 percent of the summer peak load of 1,000 MW, an additional 200 MW would be required. This additional capacity would have to be made available from new generating units, purchases, or exchanges.

Part of the system peak load is composed of interruptible customers who account for 150 MW of demand. When reserve margins are calculated it is accepted practice to subtract interruptible load from peak-load responsibility. This results in corresponding increase in reserve margins.

Staff has taken the range of load forecasts, subtracted 150 MW of interruptible load, and then computed loads, plus a 20 percent reserve margin. Therefore, Figure 1-1 and Appendix A, Tables 1 and 4, reflect the loads required to serve all firm customers and to have a 20-percent reserve margin.

The dependable capacity of all system resources without the proposed project is not adequate to meet summer peak-load and reserve requirements under any of the load-growth scenarios (Figure 1-1). The proposed project would add 70.5 MW of dependable capacity to the system, but would not result in meeting the required load or reserve capacity under any of the load-growth scenarios (Figure 1-1). Under the 2.7-percent load-growth scenario, deficits without the proposed project would range between 24.7 and 360.7 MW, while under the 4.0-percent scenario, deficits would range between 329 and 876.2 MW (Appendix A, Tables 1 and 4).

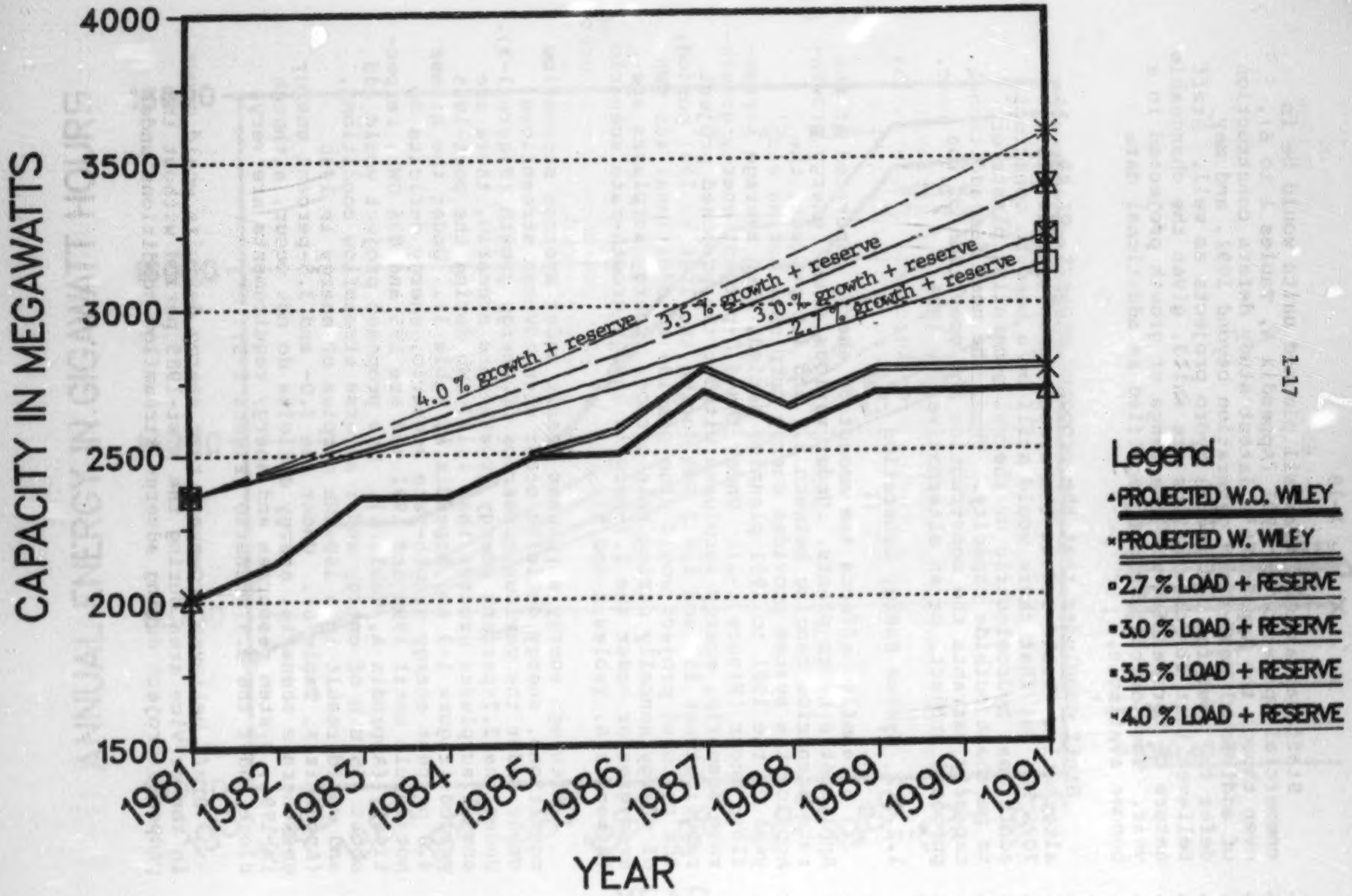


Figure 1-1. Dependable capacity of system resources and estimates of firm load and reserve capacity requirements in the Idaho Power Company service area, under various load-growth scenarios (Source: FERC Staff).

Staff has assumed that all planned units would be in commercial operation by 1991 (Appendix A, Tables 1 to 6), even though the Applicant's latest study defers construction of additional coal-fired generation beyond 1991, and may defer the need for additional hydro projects as well. Staff believes that its assumptions are valid, given the changeable nature of forecasting and the range of growth projected in a year. The forecasts may be modified as additional data become available.

Staff concludes that the proposed project, or an alternative, would reduce the system capacity deficits by 70.5 MW, but that there would still be a need to construct additional hydroelectric or thermal generating plants or to purchase outside capacity. Thus, the need for additional capacity warrants the construction and operation of the proposed project, or an alternative, by 1986.

1.2.5.2 System Energy Generation

Streamflow affects the amount of energy generated at the Applicant's hydro plants. Under various annual energy growth-rate scenarios ranging between 2.7 and 4.0 percent, the Applicant's system provides energy surpluses during each year of the 1981 to 1991 planning period, when average streamflows occur (Figure 1-2). Under the 4.0-percent energy growth-rate scenario, energy surpluses without the proposed project range between 157 and 1,332 GWh during the 1986 to 1991 period; the proposed project would also provide an additional 485 MWh of energy annually during this period. Energy surpluses are even greater under the 2.7-percent energy growth-rate scenario (Appendix A, Tables 2 and 5).

Although energy surpluses result under average streamflow conditions, energy deficits occur when adverse streamflows occur under the various scenarios of energy growth (Figure 1-3). Under the 2.7-percent energy growth-rate scenario, there are annual surpluses greater than 1,177 GWh during the post-1985 period (Figure 1-3 and Appendix A, Table 3). Under the higher 4.0 percent energy growth-rate scenario, energy deficits do not result until 1990 and 1991 and are 195 and 836 GWh, respectively (Appendix A, Table 6). The proposed project would add about 355 GWh of energy under adverse streamflow conditions, and would result in a 160-GWh surplus of energy in 1990 (Appendix A, Table 6). Under the 3.0- and 3.5-percent energy growth-rate scenario, energy deficits do not occur, although in 1991, system resources and energy requirements are very close under the 3.5 scenario (Figure 1-3).

Staff believes, however, that energy deficits would occur in the service area during the post-1985 period without the proposed project during adverse streamflow conditions under

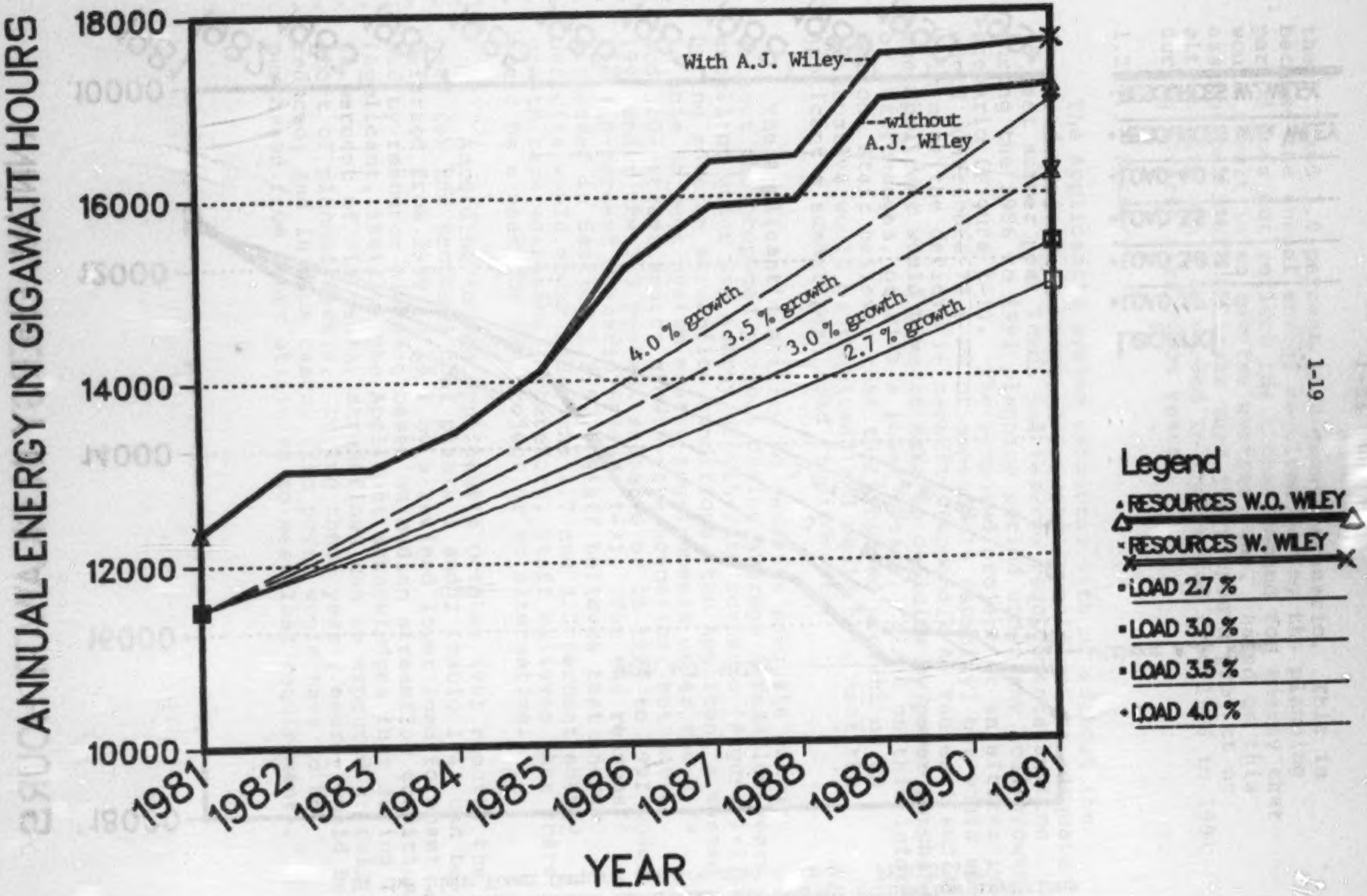
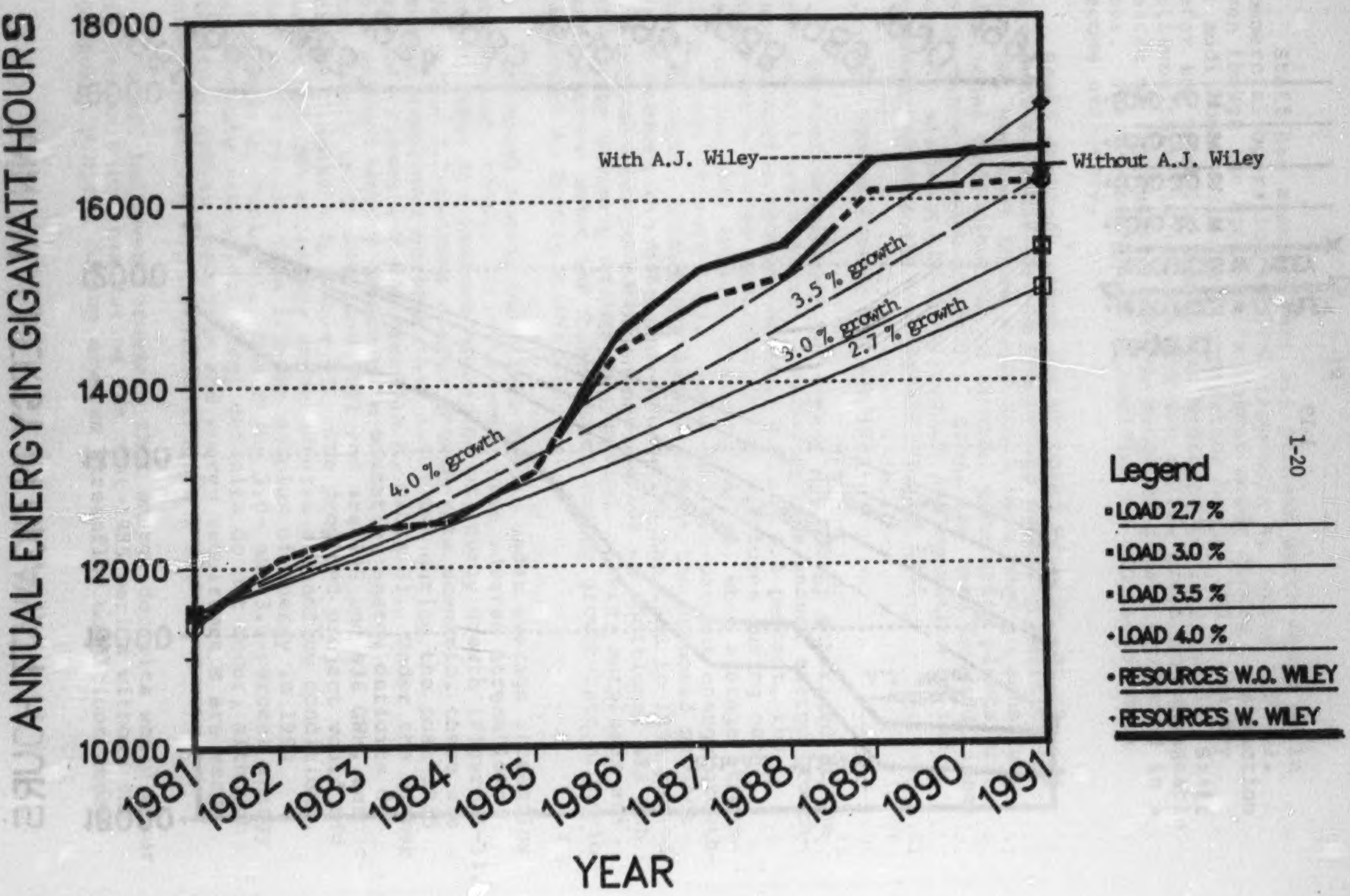

ANNUAL ENERGY IN GIGAWATT HOURS
18000
16000
14000
12000
10000
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
YEAR
With A.J. Wiley---
---without A.J. Wiley
4.0 % growth
3.5 % growth
3.0 % growth
2.7 % growth
Legend
RESOURCES W.O. WILEY
RESOURCES W. WILEY
LOAD 2.7 %
LOAD 3.0 %
LOAD 3.5 %
LOAD 4.0 %

Figure 1-2. Annual system energy resources and estimates of energy requirements assuming average weather conditions and average streamflow conditions in the Idaho Power Company service area (Source: FERC Staff).



the 2.7 and 3.0 percent load-growth scenario. This is because the annual energy required during the planning period does not reflect the higher demand for energy that would result in an adverse weather year. Based on this assumption, Staff believes that the proposed project or alternative would be needed in the period from 1986 to 1991 during adverse streamflow years.

1.2.5.3 Summary

The Applicant's system resources with or without the proposed project or energy alternative would not be adequate to meet summer peak loads and reserve requirements anytime during the 1986 to 1991 planning period under any load-growth scenario (Figure 1-1). The proposed project or an alternative would contribute 70.5 MW of dependable capacity, but would not eliminate the deficit in capacity (Appendix A, Tables 1 and 4). The Applicant would have to make up deficits by power purchases or interchanges, or risk a power outage. Based on this information, Staff believes that the proposed project or an alternative would be required, and would help meet the Applicant's summer peak load requirements.

The Applicant's ability to generate adequate energy without the proposed project during average streamflow years is excellent under any energy growth-rate scenario (Figure 1-2). During adverse streamflow conditions, the Applicant's system is able to meet system energy requirements under the 2.7- and 3.0-percent energy growth-rate scenarios, but not in 1991 under the 3.5 percent scenario or in 1990 to 1991 under the 4.0-percent scenario (Figure 1-3). For the reasons discussed in Section 1.2.5.2, Staff believes that energy deficits would occur under the 2.7 and 3.0 percent energy growth rate scenarios. Therefore, Staff believes that there would be a need for the project or an alternative.

According to the Applicant's October 1981 report, the need for the proposed coal plants 1 and 2 (Table 1-4) can be deferred from 1989 to 1992 by a revised lower load forecast and by resource planning based on median streamflow conditions (Applicant, 1981d). The Applicant acknowledges that during 50 percent of all years, streamflows can be expected to fall short of planned levels. During these years, energy would be reduced, and in some cases, firm power would have to be purchased from other utilities to meet load requirements.

1.3 FEASIBILITY OF ALTERNATIVES TO THE PROPOSED ACTION

Staff reviewed the economic feasibility of alternative project designs and the economic feasibility of hydroelectric, non-hydroelectric, and nonstructural projects as alternatives to the proposed A.J. Wiley Project. The dependable capacity and energy that could be produced by a project were used as criteria.

1.3.1 Alternative Project Designs

1.3.1.1 Bliss Bridge Site

The Applicant considered the feasibility of constructing an earth-fill dam and a concrete buttress dam at the proposed A.J. Wiley site. The earth-fill dam was selected over the buttress dam concept because of its lower costs. Staff concurs in the assessment, and believes that the foundation conditions at the site are more compatible for embankment dam construction.

The proposed damsite foundation has very complex geological formations that would require special care in design and construction to make sure that the project would not cause excessive future maintenance costs. The greatest potential problem is posed by the existence of a massive deposit of pillow lava in a brecciated sand matrix on the right abutment of the proposed site (Letter of January 30, 1980, from Harold E. Malde, U.S. Geological Survey, to Idaho Power Company). The pillow lava is highly permeable and provides the potential for seepage around the dam. The potential complications posed by the pillow lava deposit were earlier identified by Harold T. Stearns, consulting geologist, and set forth in a 1954 report, titled "Geology of the A.J. Wiley Dam Site." Stearns (1954) recommended studying an alternative site just upstream of Bliss Bridge on Shoestring Road, believing that the pillow lava might be less of a problem there. The cross-sections of the river included in the 1954 report indicate that the pillow lava deposit is located more in the existing channel and less on the abutment wall, and becomes thinner proceeding upstream.

The Applicant has conducted a drilling program at the alternative site, and has submitted a preliminary design and cost estimate for constructing the project at the Bliss Bridge site (Idaho Power Company, 1981f). This alternative has been designated the Bliss Bridge damsite, and is evaluated throughout this statement. Section 2.2 describes the Bliss Bridge damsite alternative in detail.

In evaluating a design for the Bliss Bridge damsite alternative, the Applicant stated that the tailrace below Bliss Bridge could be excavated to reduce the head loss to about 2 feet, at a cost of about $1 million. Staff rejected this possibility, because it would increase project benefits by less than 1 percent, and would require dragline excavation of about 4,000 feet of river channel from Bliss Bridge downstream past the goose-nesting island; this action would convert the island into a peninsula. In addition, dragline activities and spoil disposal would cause severe impacts to riparian habitat and associated wildlife and would increase the levels of turbidity and suspended solids. These conditions would adversely affect fisheries and aquatic resources for a considerable distance below the site of the Bliss Bridge Dam.

1.3.1.2 Alternative Reservoir Elevations

The Applicant's engineering consultants, International Engineering Company, Inc. (IECO), performed studies to determine the optimum reservoir elevation for the proposed A.J. Wiley Project (International Engineering Company, Inc., 1978). The studies showed that the net benefits of the proposed project increase with an increase in reservoir elevation, up to an elevation of 2,738.5 feet. [1] Above elevation 2,738.5 feet, the project net benefits decrease with increasing reservoir elevation, because the cost of raising the reservoir would be greater than the value of the increased energy produced. Elevation 2,735 feet was selected as the optimum reservoir elevation for the project, because a reservoir elevation greater than 2,735 feet would result in a tailwater elevation at the Lower Malad Powerplant higher than the generator floor; this would require modification to the Lower Malad Powerplant.

Staff has evaluated the economics of constructing the project with a lower reservoir elevation. The studies show that the benefit-cost ratio would decrease with lower reservoir elevations, and that the project would be uneconomical at reservoir elevations below 2,718 feet. The proposed A.J. Wiley Project would cost the Applicant's rate payers $12.9 million less annually over the license period than would power from a newly constructed coal-fired steam-electric plant (Table 1-9). If the project were constructed with a reservoir elevation of 2,718 feet, the cost of energy produced would be the same as a newly constructed coal-fired steam plant, that is, $52.24 million annually, and the net benefits of the proposed project ($12.9 million) would be lost (See Table 1-9). Over the 50-year license period, taking fuel escalation into account, the value of each foot of reservoir elevation (rise between 2,718 and 2,735 feet), would be $758,800 annually.

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[1] Net benefits are the savings that would result from operating a hydroelectric plant instead of a coal-fired steam-electric plant for one year.

The slope of the riverbed upstream of the proposed dam is fairly uniform, with 1 foot of reservoir elevation representing approximately 571 feet of river inundation. Figure 2-1 shows that at elevation 2,718 feet, the proposed reservoir would extend approximately 3,500 feet upstream of the confluence of the Malad and Snake Rivers, or 3,000 feet below Lower Salmon Falls Dam. To preserve this upper reach would cost the equivalent of $12.9 million in annual net benefits over the license period, or $3,680 per year per foot of river preserved, thereby making the project not economically feasible.

1.3.2 Hydroelectric Alternatives

1.3.2.1 Major Projects

The Applicant has filed for FERC preliminary permits or licenses for the most economical major hydroelectric projects within its service area. Following is a list of those projects and their status:

Project No.	Project Name	Capacity(MW)	Status
2930	North Fork Payette	273	License issued June 28, 1982
2848	Cascade	12.4	Under construction
2845	A.J. Wiley	87	License application pending
2846	Dike	50	Preliminary permit issued
2884	South Fork Payette	85	Preliminary permit issued
3477	Kanaka Rapids	20	Preliminary permit

A major project license has also been issued to the Boise Board of Project Control for the 79-MW Lucky Peak Project; all of the output from Lucky Peak will be sold to the Applicant. The Raft River Electric Cooperative filed an application for license to construct and operate the proposed Eagle Rock Project, FERC No. 2789, on February 25, 1982. None of the projects can be considered as alternatives to the A.J. Wiley

Project because they are now or soon will be proposed for development. Even if all of the proposed hydroelectric projects were constructed, Applicant would need to construct more new generating resources or purchase resources to meet its loads of the late 1980's with adequate reserve margins.

Preliminary permits for large hydroelectric projects in Idaho have also been issued to applicants other than the Idaho Power Company for the following projects:

Project No.	Project Name	Capacity (MW)	Permittee
2789	Eagle Rock	50	Raft River Elec. Coop.
2873	Island Park	5	Fall River Elec. Coop.
2899	Milner Hydro	50	Twin Falls and North Side Canal Company
3079	Clear Springs	30	Idaho Dept. of Water Resources
3858	Dietrich Drop	8	Idaho Renewable Resources Inc., and City of American Falls, District No. 2
3878	Upper and Lower Messa Falls	12.5	Gregory Wilcox
4649	Deadwood Dam	6.4	City of Ammon
4650	Lower Deer Flat	6.3	City of Ammon
4651	Upper Deer Flat	8.8	City of Ammon
4656	Arrowrock Dam	60	Boise-Kuna Irrigation District
4690	North Fremont	5.7	Fall River Rural Electric Coop.
5005	Ririe Dam	5	City of Ammon
5090	Shelley Hydro	14	Idaho Falls
5346	American Freedom Dam	24	A and J Construction Company
5797	Star Falls	15	B and C Energy Company

These projects cannot be considered as alternatives to the proposed A.J. wiley Project, because they are not proposed for development at this time; they are proposed only for study.

Staff included those projects for which applications for license are known to be in preparation as resources in the studies of the need for power in Section 1.2.5.

1.3.2.2 License Exemptions

As of June 2, 1982, FERC had granted 27 exemptions from license for hydroelectric projects in the state of Idaho; these exemptions represent a potential installed capacity of 15 MW. On the same date, 21 applications for exemption for projects in Idaho were pending with FERC; these applications represent a potential installed capacity of 18.7 MW. There is no assurance that these Idaho projects will be built. Consequently, the Staff cannot determine how much electric capacity will be developed as a result of exemptions granted or pending.

The incremental cost of new firm power in the Idaho Power Company system was approximately 6 1/2 cents per kWh in June 1982. The cost of energy from small hydro units usually is about 9 1/2 cents per kWh and higher, and the energy produced is rarely firm. If 50 percent of all the Idaho exemptions are constructed (an optimistic assumption), then the exemptions would provide no more than 15 MW of nondependable capacity in the foreseeable future. Even in combination with other potential power development and with conservation, this amount of nondependable capacity would not eliminate the need for the proposed project or for an alternative to meet power load requirements under adverse water conditions.

The Staff notes that estimates for small hydro projects in Idaho have ranged from 80 to 300 MW of installed capacity. These estimates are based on water-rights filings and other information. Given this information and that contained in Idaho Power Company (1981d), Staff has assumed that 80 MW of installed capacity would be in operation by 1991. For purposes of analysis (Section 1.2.5), Staff has also assumed that these projects would begin operation at the time stated by the Applicant (Idaho Power Company, 1981d).

1.3.2.3 Alternative Development of Wiley Reach

There is a significant volume of ground water that enters the Snake River from springs in the north canyon wall between the Malad River and the proposed damsite.

The development of the proposed project would not eliminate the hydropower potential of the falling spring water, but would reduce the developable head of the water by an average of 35 feet. The total potential energy development of the river would not be reduced, because the Wiley Project would develop the head that would be lost to the potential development of the springs.

Staff has made a preliminary evaluation of the possible alternatives of developing the reach of river from the Bliss Reservoir to Lower Salmon Falls Dam with multiple low-head projects rather than the single medium-head project. Because of the high cost of providing multiple dams and spillways for low-head projects, and the higher cost of low-head turbines and multiple generators, such a scheme would be economically infeasible, with a cost of from 50 to 100 percent more than the cost of the proposed project.

Staff has also evaluated constructing the proposed project with different reservoir elevations, and has evaluated construcing the dam at another site upstream of the proposed site. The alternative of constructing at another site is treated in full in this impact statement as an alternative project design, and the evaluation of the reservoir elevation is discussed in the Alternative Design Section (1.3.1) of this statement.

1.3.3 Nonhydroelectric Alternatives

1.3.3.1 Coal-fired, Steam-electric Project

Based on the estimated average annual energy for the period of record (485.4 GWh), the A.J. Wiley Project would have a capacity factor of approximately 64 percent. This corresponds roughly to the capacity factor for large base-load coal and nuclear generating stations.

The benefits of a coal-fired, steam-electric project are that it would supply power at a high-load factor to the system, its capacity would be dependable, and its energy production would not be affected by adverse streamflow conditions. Coal is also currently available in abundant supply at relatively low prices in states surrounding Idaho.

The Applicant has experienced difficulties in obtaining approval to site a coal-fired generating plant within the state of Idaho. Approval to construct the proposed Pioneer coal-fired generating plant on a site at Orchard, Idaho, selected by the Applicant was denied by the IPUC in 1976.

After the Applicant was denied the Orchard site, the company studied other potential sites in southern Idaho. In 1977, the Applicant applied to the IPUC for a permit to construct a 500-MW coal-fired plant at one of three potential sites, but withdrew this application when it applied to the IPUC for approval of its participation in the North Valmy coal-fired plant in Nevada. No applications for plant siting were considered by the IPUC in 1980.

Participation by the Applicant with neighboring utilities in out-of-state thermal generating plants has enabled the Applicant to meet the electrical energy requirements of its service area. Sharing out-of-state generating facilities may continue to be viable in the short term, but cannot remain the only option available to the company when there is a need for large amounts of capacity and energy. The reasons for this are that neighboring utilities may require all of the power to meet their customer needs in future years and the availability of suitable sites in neighboring states is finite.

Some of the adverse effects of a coal-fueled baseload steamplant on the environment are: (1) impact of air pollution from stack emissions; (2) disposal of by-products of combustion such as fly ash and sulphur compounds; (3) consumptive use of water and release of heat, or heat and water vapor, to the atmosphere from cooling towers, or in the absence of cooling towers, heated water discharges; and (4) consumption of an exhaustible coal resource. Adverse impacts on visual quality in the vicinity of the steamplant could be caused by construction of cooling towers, high stacks, combustion by-products disposal, coal-handling equipment, and fuel storage areas.

Cooling towers that would serve to cool condenser water would release heat to the atmosphere. Depending upon the type of cooling facilities provided, the heated air could be saturated with water vapor. Such releases alter the air currents and humidity of the surrounding atmosphere, causing some change in local weather patterns. A once-through condenser water cooling system, if used instead of cooling towers, would result in the discharge of warm water. The effects of heated water discharges upon the receiving body of water would depend on the volume of flow and its temperature rise over the condensers, as well as the relative volume of discharge and natural flow in the receiving body. Increasing the water temperature could increase the rate of metabolic activity and oxygen consumption by aquatic organisms, and could reduce the amount of dissolved oxygen in the receiving water body.

1.3.3.2 Nuclear Steam-electric Plant

At the beginning of 1981, the Pacific Northwest had a total of 1,990 MW of installed capacity in nuclear facilities located in two plants--Washington Public Power Supply System's (WPPSS) Hanford Plant near Richland, Washington and the Portland General Electric Company's Trojan Plant at Portland, Oregon. Planned deferrals of WPPSS nuclear plants under construction, Skagit and Pebble Springs, have created a major change in the Pacific Northwest's resource forecast.

Experience has shown that nuclear units are highly susceptible to delays because of financial and safety reasons. Nuclear units are also subject to legal challenges. Nuclear plants currently require an average of 12 years between site selection and startup. Nuclear unit sizes of 1,000 to 1,300 MW are common, and these blocks of power are much larger than the increases the Applicant is forecasting. Thus, a nuclear plant would have to be constructed jointly with other utilities, or the Applicant would need to sell the power to other utilities for a time. Consequently, the lengthy lead time required for permits, design, and construction, heavy capital requirements, and large size of nuclear facilities all contribute to reducing the feasibility of nuclear power for the Applicant until at least the mid-1990's.

1.3.3.3 Geothermal Development

Geothermal technology has two implications for the Applicant: geothermal energy could be used to generate electricity for the regional system; or geothermal space and water heating could reduce load.

Because of the relatively low temperatures of the geothermal resources in the Applicant's service area, additional research and development are required before the production of electric energy by this source is economically viable. It thus appears that for the near term, the potential for geothermal energy production in the service area will reduce the demand for electricity required for heating and reduce the demand for those industrial processes where geothermal energy can be substituted.

Geothermal exploration in Idaho increased slightly during 1980. A few deeper exploratory holes were drilled by industry, and activity continued on space heating projects in Boise, including preliminary planning by Boise Geothermal, Inc., for development of a heating system for the downtown business district. A 3,946-foot-deep hole was drilled by the Madison County Energy Commission south of Rexburg to assess the space heating potential in that area. Apparently, the deepest geothermal exploration within the state by industry is a 7,981-foot-deep hole drilled near Preston in Franklin County.

The Applicant and other utilities are conducting research into low-temperature geothermal generation at a Department of Energy (DOE) test site at Raft River, Idaho. DOE is building a 5-MW binary-cycle plant at Raft River to generate electricity from a moderate-temperature resource. A 60-kW plant has already operated successfully. A larger generator should be in operation by the end of 1981. The Raft River research involves use of a prototype turbine and generator to evaluate various techniques of using the low temperatures. The Raft River pilot powerplant uses a moderate-temperature geothermal liquid (290°F at the source) to heat a secondary fluid and cause it to vaporize. Two stages of heating are employed in order to extract as much heat as possible from the geothermal fluid.

Since the Raft River geothermal project is a very small pilot test project (5 MW) and is not ready for large-scale commercial application, geothermal energy is not considered a viable alternative to the A.J. Wiley Project.

1.3.3.4 Solar Development

The applicability of solar space heating is being investigated by the Applicant at a demonstration home in the Boise area. Solar home heating is gradually becoming competitive with other energy sources. To reflect this trend, Applicant's load projections assume that solar water heating and space heating will account for about 5 percent of the residential customers' needs by the end of the 20-year forecast period (1999). Solar thermal electric power systems and photovoltaic energy systems are not expected to be commercially demonstrated until after 1995, and do not constitute a viable alternative to the proposed project.

1.3.3.5 Wind Turbine System

Wind as a source of electrical energy appears to be the most highly developed of the renewable energy sources other than hydropower. Three 2.5-MW wind generating units are being constructed at the Goodnoe Hills Wind Project, located near Goldendale, Washington. Construction of the first unit was completed in late 1980, and construction of the remaining two units was due to be completed by mid-1981. The BPA has been selected by DOE to field test this cluster of three 300-foot-diameter experimental wind turbines. The three wind turbines will be the largest ever built. The project will provide the first test using a grouping of turbines to generate electric power for a utility grid. BPA will operate the wind turbines for a field test period of about 2 years.

Since existing power in the region is predominantly hydroelectric, the evaluation of the use of wind power to supplement water power will be one of the main features of the test program. When all three wind turbines are operating, the installation should generate up to 7.5 MW of electricity, approximately enough for 2,000 to 3,000 average homes. It is estimated that the turbines will produce about 25 million kWh of electricity annually.

Wind and other alternative power resources are characterized by the erratic nature of their output. In order to make largescale wind-power production a viable source of energy, some mechanism must be provided to smooth out the power output fluctuations so that the energy can be used when needed. In the Northwest, it is often assumed that the extensive hydroelectric system can be used for this purpose. In August 1980, BPA completed a wind-energy integration study to identify constraints on the operation of a hydroelectric system that might limit its ability to absorb an intermittent resource such as wind. The goal was to identify those significant effects that require planning consideration, rather than to provide a detailed investigation of all operational aspects. BPA found that the most significant impacts occurred in hourly planning and operation. Preliminary conclusions indicated that anywhere from 16 to 37 percent (depending on streamflow conditions) of the gross energy produced by the simulated wind network would not be usable because of operational constraints on the hydro system.

Large, mass-produced wind turbines could be available for utility windfarm development in the late 1980's. Staff evaluated the potential for wind-power development in Idaho, and concluded that wind-power is not an economically feasible alternative to the proposed project. The cost of wind power, including 70.5 MW of dependable capacity, would be 16.44 cents per kWh of energy produced; this is significantly greater than the cost of power for a coal plant or the proposed project, which would be 8.76 cents and 8.0 cents per kWh, respectively, in 1986, the first year of proposed project operation.

1.3.3.6 Purchased Power

As an alternative to constructing facilities in Idaho sufficient to meet demand in the Applicant's service area, a policy of power trading and seasonal purchases has been discussed in Idaho electric supply debates. In this scenario, the demand is assumed to be met with imported power rather than with part ownership of plants.

The most recent base case forecast of regional power needs by BPA projected energy surpluses until 1990 (Bonneville Power Administration, 1982). This situation would indicate that the Idaho Power Company could make up for any system energy deficits from purchased power in the near term, and reduce its exposure to power outages until 1990 at which time it would be required to supply its own requirements from new resources. A four year power purchase from 1986 to 1990 can not be considered as an alternative to a project which would provide power for at least 50 years. Thus outside power purchases do not constitute a viable alternative to the proposed A.J. Wiley or other energy alternatives.

1.3.4 Nonstructural Alternatives--Load Management

The steps that have already been taken to the Applicant towards conservation, pricing, and load management were described in Sections 1.2.4.1, 1.2.4.2, and 1.2.4.3. In the following section, possible expansion of these nonstructural alternatives and additional ones are discussed.

Load management is intended to optimize utilization of power supply resources and to reduce the need for building new facilities by moving customer use of electrical energy away from periods of peak demand as much as possible.

A number of approaches to this have been tried. Time-of-day rates (which encourage customers, by means of a lower rate, to use electricity during off-peak hours) are being tested by a number of utilities. Additional metering is necessary to categorize the electricity usage by customer. Time-of-day rates were studied in the Salt River Project, and it has been tentatively concluded that benefits outweigh costs for those customers using more than 2,500 kWh in peak summer months and 1,700 kWh in peak winter months. Only about 10 percent of Salt River's residential customers and 50 percent of its commercial users currently fit those categories.

Somewhat analogous to this point is the use of electric-thermal-storage (ETS) furnaces and water heaters. These are energized only during off-peak hours (usually from 11 p.m. to 7 a.m.), storing up heat energy for use during on-peak hours. The American Electric Power Company, Inc., tested this concept in 71 homes over a 3-year period ending in 1976, and has had special residential load management time-of-day rates approved in all seven states within its territory. A sizable increase in ETS popularity in 1981 and beyond is anticipated.

The Applicant has instituted another form of load management by using the option of power supply interruptions. Financial incentives have been offered to, and accepted by, large industrial customers for service contracts that permit load interruptions during periods of peak demand or during system emergencies. The Applicant recently increased the rates charged to its interruptible industrial customers, but the rates for interruptible service are still lower than the rates for noninterruptible service. The Monsanto Company and the FMC Corporation are industrial customers that have interruptible contracts with the Applicant. Interruptible sales have a further advantage; when reserve margins are calculated, it is accepted practice to subtract interruptible load from peak load responsibilities. This results in corresponding decreases in required reserve margins.

Other effective load management schemes include the use of commercially available systems for interrupting the power supply to domestic hot-water heaters, electric space heaters, air conditioners, and other high-demand domestic loads, and the shift of industrial loads from peak-demand hours to off-peak hours, where expedient. The commercial schemes for interrupting the power supply to selected domestic appliances require a dual wiring system in homes in order to segregate the interruptible portions of the load from the noninterruptible portions; and area-wide control is accomplished from a control point selected by the utility.

1.3.5 Economic Comparison of Alternative Forms of Generation

The proposed project would have a dependable capacity of 70.5 MW and would produce an average of 485.4 GWh of energy annually.

The most economical and reasonable nonhydroelectric alternative to the proposed project would be a base-load, coal-fired generating plant. Since it would not be reasonable to assume that the Applicant would construct an 84-MW steam plant, because of the economics of scale, Staff has assumed that 86 MW of capacity (70.5 MW dependable) and 485 GWh of energy would come from a 250-MW, coal-fired steam plant located near Bliss, Idaho.

The proposed project and the project as constructed at the alternative site (Bliss Bridge) were compared with the coal-plant alternative. The results of the economic studies include cost estimates to remedy worst-case geologic conditions previously discussed in Section 1.3.1.1 and also in Section 2.1.9.2 (Table 1-9). Since the Bliss Bridge alternative would have less capacity and generate less energy than the project as proposed, the cost of supplemental capacity and energy from a steam plant was added to the Bliss Bridge alternative to make it equivalent to the proposed A.J. Wiley Project and the coal-plant alternative.

Table 1-9. Economic comparison of the proposed A.J. Wiley Project with the most feasible and economical alternatives, assuming worst-case geological conditions and including costs of respective remedial measures. 1/

	Proposed A.J. Wiley Project	A.J. Wiley Bliss Bridge site plus supplemental capacity and energy	Capacity and energy from a 250-MW steam plant at Bliss
Installed capacity (MW) 2/	86	86	84.4
Dependable capacity (MW)	70.5	70.5	70.5
Total capital cost for mid-point of construction including interest ($million)	212.33	199.47	174.7
Annual energy generation 50-year average (GWh)	485.4	485.4	485.4
1986 total annual cost 3/ ($million)	38.84	37.22	42.53
Cost in mills/kWh	80.0	76.67	87.63
50-year, present worth, levelized 4/ Annual cost ($million)	39.37	38.33	52.24
Cost in mills/kWh	81.1	78.97	107.63
1986 power benefit-cost ratio 5/	1.095	1.14	NA
50-year, present-worth, levelized power 6/ benefit-cost ratio	1.33	1.36	NA
Average annual coal consumption	0	17,515 tons	272,400 tons

1/ FERC staff.

2/ 1 megawatt equals 1,000 kilowatts.

3/ 1986 annual costs include fixed costs, operation, maintenance, administration, and general expenses.

4/ 50-year, present-worth, levelized annual costs are based upon 10 years of escalation of 10 percent annually for fuel, 7 percent O&M expenses, and 12.95 percent cost of money.

5/ 1986 benefit-cost ratio is the 1986 cost of the coal-fueled alternative energy divided by the 1986 cost of hydro plant energy.

6/ The 50-year power benefit-cost ratio is the 50-year, present-worth, levelized cost of the coal-fueled alternative energy divided by the 50-year, present-worth, levelized cost of the proposed project energy.

7/ The Bliss Bridge alternative would have 4.5 feet less head and produce 6.43 percent less power than the proposed project. The balance of power would come from a coal plant alternative; the figures in the table reflect the addition of 6.43 percent of the capacity and energy figures and their costs from the steam plant alternative column. The total capital cost of the Bliss Bridge alternative is $188.24 million.

As can be seen from Table 1-9, the proposed project would have a 1986 benefit-cost ratio of 1.095, which would increase to 1.33 when the escalation of fuel is considered, using a 50-year, present-worth, benefit-cost analysis. The project, if constructed at the Bliss Bridge site, would have a 1986 benefit cost ratio of 1.14 which would increase to 1.36 when fuel escalation is considered and a 50-year, present-worth analysis is used (Table 1-9). The Bliss Bridge site would have a higher benefit-cost ratio because it would require less grouting to overcome potential problems posed by the pillow lava.

Section 2

PROPOSED ACTION AND ALTERNATIVES

This section provides detailed descriptions of the proposed action, alternative 1 (Bliss Bridge damsite), alternative 2 (coal-fired, steam-electric plant), and alternative 3 (no action) in terms of location, facilities, work-force requirements, and construction and operation schedules. This section also discusses special cost considerations that were included in Staff's economic analysis in Section 1.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 A.J. WILEY PROJECT--THE PROPOSED ACTION

2.1.1 Location

The A.J. Wiley Project would be located on the Snake River, upstream of the Applicant's Bliss Project, FERC No. 1975, in Twin Falls and Gooding Counties, Idaho. The project would be approximately 85 miles southeast of Boise, 28 miles northwest of Twin Falls, and 1.7 miles southwest of Bliss, Idaho, at elevation 2,735 feet msl 1/ (Figure 2-1).

2.1.2 Facilities

2.1.2.1 Dam and Reservoir

The dam would be a 100-foot-high earth embankment with a crest elevation of 2,742 feet. The reservoir would have a maximum normal water surface elevation of 2,735 feet. The embankment, constructed of random fill with an impervious central core, would extend 680 feet from the left abutment, abutting a concrete retaining wall built adjacent to the left side of the powerhouse (Figure 2-2).

The spillway as proposed in the application for license would pass flows up to 100,000 cfs. Applicant did not evaluate the ability of the project to pass the probable maximum flood. Staff will recommend that an article be included in the license, if issued, requiring that the project be designed to safely pass the probable maximum flood flow.

A 175-foot-wide, mass concrete, ogee spillway and stilling basin would be located on the right (north) abutment. The spillway crest, at elevation 2,700 feet, would be controlled by three, hoist-operated, 45-foot-wide and 35-foot-high radial gates. The intake and powerhouse structure would form the dam section between the embankment and the spillway (Figure 2-3).

The reservoir created by the Wiley Dam would extend to the tailwaters of the existing Lower Salmon Falls and Lower Malad Powerplants, FERC Projects Nos. 2061 and 2726, respectively. It would be a narrow body of water, confined by the canyon walls, with a surface area of 625 acres and a capacity of 24,000 acre-feet at elevation 2,735 feet (Figure 2-1).

1/ All elevations refer to mean sea level datum unless otherwise stated.

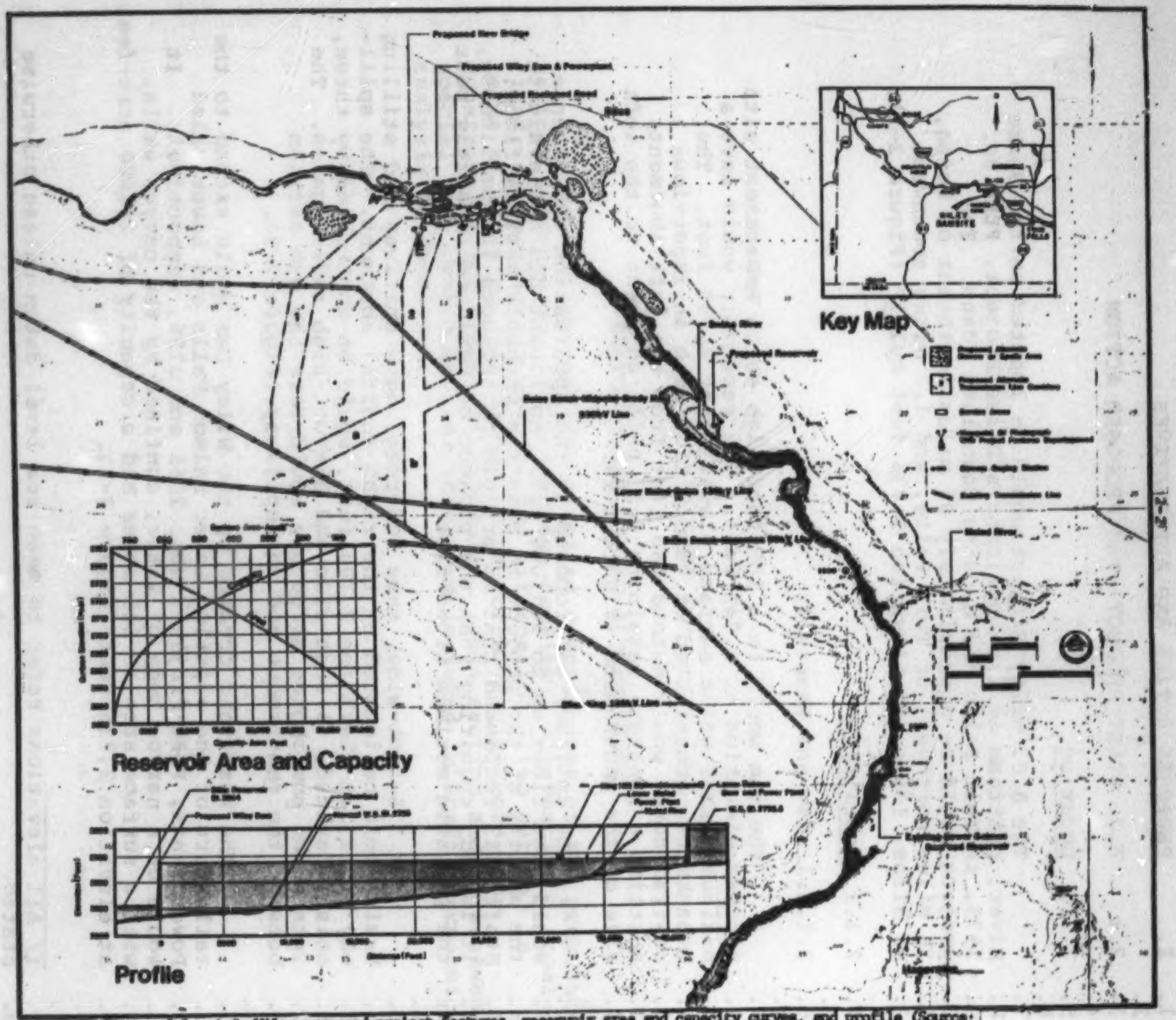
Proposed New Bridge
Proposed Wiley Dam & Powerplant
Proposed Realigned Road
Snake River
Proposed Reservoir
Key Map
Malad River
Reservoir Area and Capacity
Capacity
Area
Proposed Wiley Dam
Profile

Figure 2-1. A.J. Wiley proposed project features, reservoir area and capacity curves, and profile (Source: Idaho Power Company, 1981b, Application, Exhibit W).

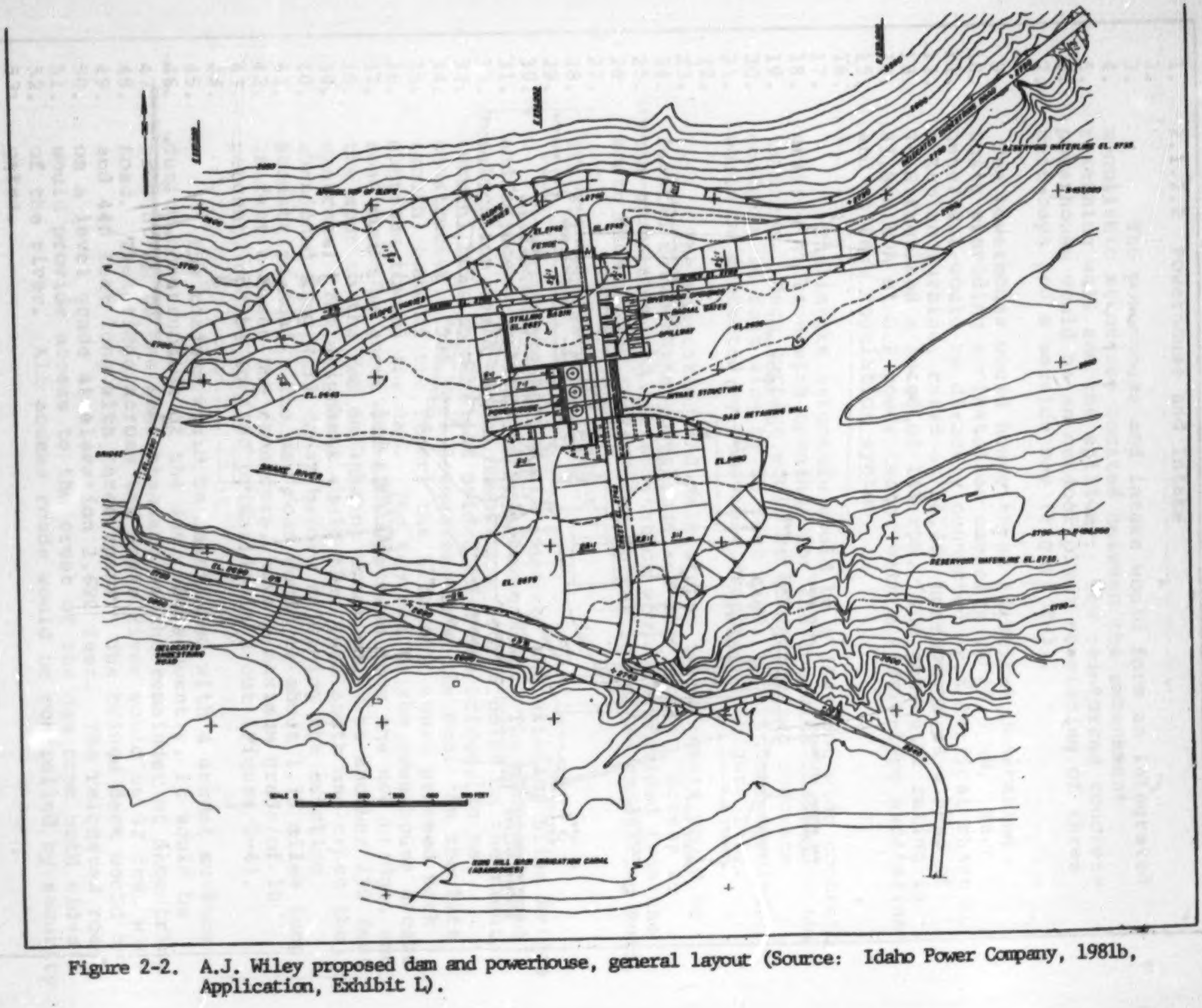
RESERVOIR WATERLINE EL. 2735
RELOCATED SHOESTRING ROAD
APPROX. TOP OF SLOPE
SLOPE VARIES
FENCE
STILLING BASIN
SPILLWAY
RADIAL GATES
INTAKE STRUCTURE
DAM RETAINING WALL
POWERHOUSE
SNAKE RIVER
BRIDGE
EL. 2645
EL. 2690
EL. 2670
RESERVOIR WATERLINE EL. 2735
RELOCATED SHOESTRING ROAD
2700
2800

Figure 2-2. A.J. Wiley proposed dam and powerhouse, general layout (Source: Idaho Power Company, 1981b, Application, Exhibit L).

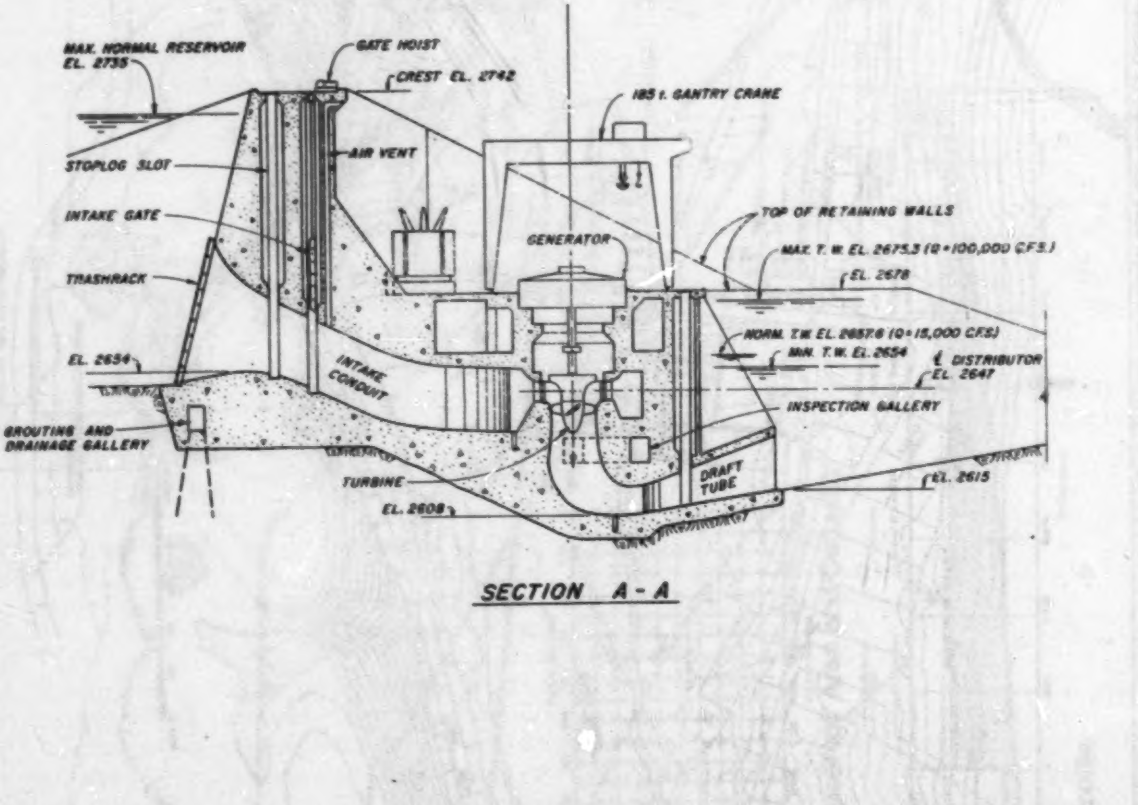
MAX. NORMAL RESERVOIR EL. 2735
GATE HOIST
CREST EL. 2742
185 t. GANTRY CRANE
STOPLOG SLOT
AIR VENT
INTAKE GATE
TOP OF RETAINING WALLS
GENERATOR
MAX. T. W. EL. 2675.3 (Q = 100,000 C.F.S.)
EL. 2678
TRASHRACK
NORM. T.W. EL. 2657.6 (Q = 15,000 C.F.S.)
MIN. T.W. EL. 2654
EL. 2654
INTAKE CONDUIT
℄ DISTRIBUTOR EL. 2647
INSPECTION GALLERY
GROUTING AND DRAINAGE GALLERY
DRAFT TUBE
TURBINE
EL. 2615
EL. 2608
SECTION A - A
SCALE 0 20 40 60 80 100 FEET

Figure 2-3. A.J. Wiley proposed intake-powerhouse structure, plan and section (Source: Idaho Power Company, 1981b, Application, Exhibit L).

2.1.2.2 Powerhouse and Intake

The powerhouse and intake would form an integrated monolithic structure located between the embankment retaining wall and the spillway. The reinforced concrete powerhouse would be an outdoor plant consisting of three unit bays and a service bay (Figure 2-3).

The powerhouse would house three identical generating units providing an installed capacity of 85.8 MW. Each generator would be directly connected by a vertical shaft to a Kaplan turbine, rated at 38,400 horsepower at a head of 76.8 feet and a speed of 144 rpm. The generator rating is 31,800 kVA at 0.9 power factor with a static-type excitation and voltage regulation system.

The intake structure would be a 164-foot-wide concrete gravity section with openings for the conduits leading to the turbines. Each turbine would be served by two concrete conduits 16 feet wide by 20 feet high. The intake openings would be protected by removable trashracks (Figure 2-3).

The substation and main stepup transformers would be located between the powerhouse and the intake. Access to the powerhouse and the substation would be provided from the south bank of the Snake River on the relocated Shoestring Road.

2.1.2.3 Access Facilities

Wiley Reservoir would inundate the existing Bliss Bridge and adjacent portions of Shoestring Road. The proposed road relocation would extend downstream from a point on the right (north) bank above Bliss Bridge to a new bridge, to be constructed 1,500 feet downstream from the dam. On the left (south) bank of the river, the alignment would proceed back upstream toward the dam. The turnout to the powerhouse access road would be about 600 feet upstream from the new bridge, and the spur to the dam embankment crest would be another 850 feet upstream. The alignment would then turn south and cross the abandoned King Hill canal before rejoining the existing Shoestring Road. The new road would be about 1.75 miles long, 28 feet between the shoulders, have a maximum grade of 10 percent, and be located primarily in a cut (Figure 2-4).

The roadway would be maintained with a gravel surface during construction of the dam. Subsequently, it would be brought up to the same standard as the remainder of Shoestring Road. The bridge across the Snake River would be 32 feet wide and 440 feet long with three spans. The bridge deck would be on a level grade at elevation 2,690 feet. The relocated road would provide access to the crest of the dam from both sides of the river. All access roads would be controlled by security gates.

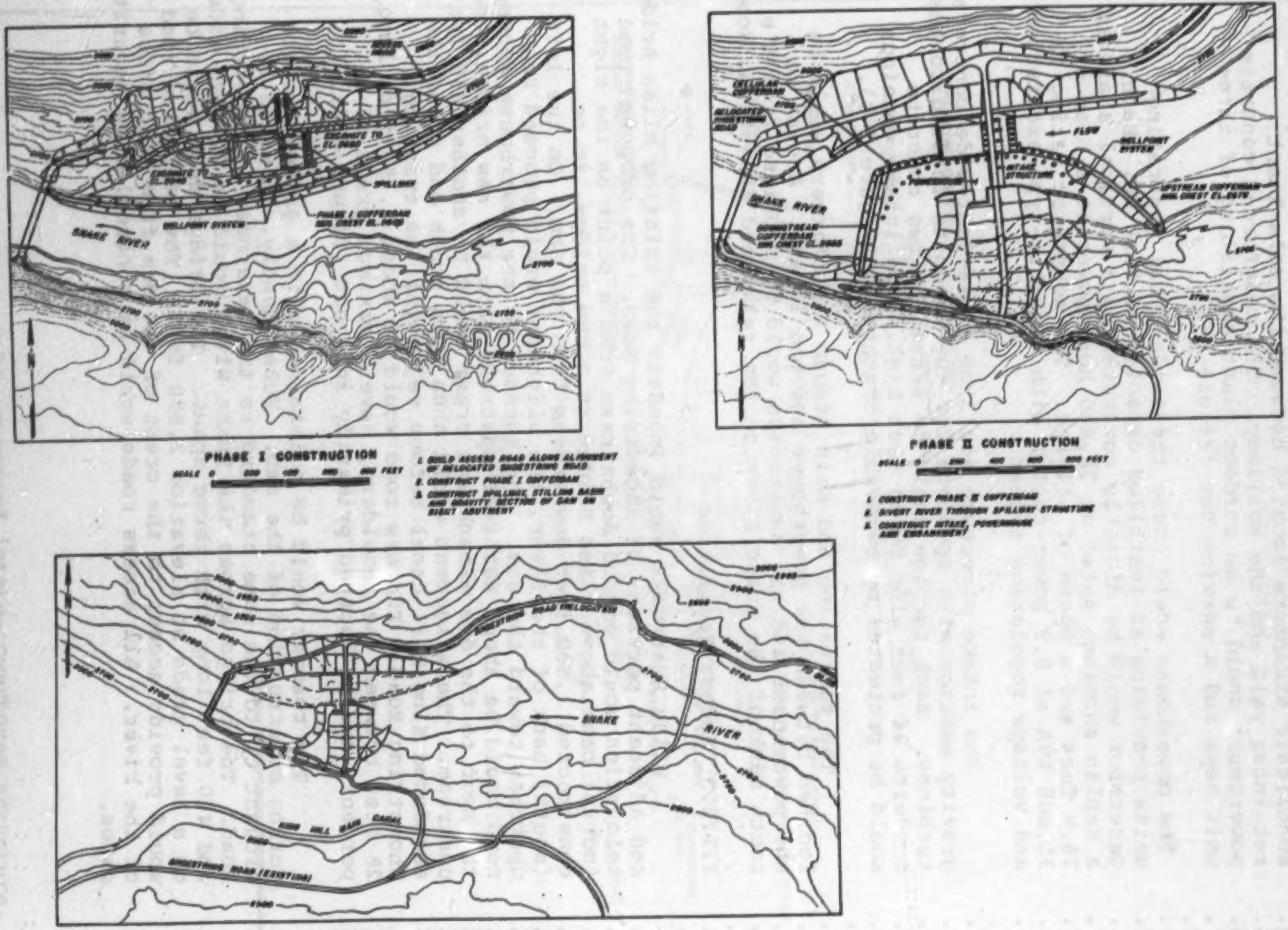
SNAKE RIVER
WELLPOINT SYSTEM
PHASE I COFFERDAM
SPILLWAY
ACCESS ROAD
PHASE I CONSTRUCTION
SCALE 0 200 400 600 800 FEET
1. BUILD ACCESS ROAD ALONG ALIGNMENT OF RELOCATED SHOESTRING ROAD
2. CONSTRUCT PHASE I COFFERDAM
3. CONSTRUCT SPILLWAY, STILLING BASIN AND GRAVITY SECTION OF DAM ON RIGHT ABUTMENT
CELLULAR COFFERDAM
RELOCATED SHOESTRING ROAD
FLOW
WELLPOINT SYSTEM
INTAKE STRUCTURE
POWERHOUSE
UPSTREAM COFFERDAM
DOWNSTREAM COFFERDAM
SNAKE RIVER
PHASE II CONSTRUCTION
SCALE 0 200 400 600 800 FEET
1. CONSTRUCT PHASE II COFFERDAM
2. DIVERT RIVER THROUGH SPILLWAY STRUCTURE
3. CONSTRUCT INTAKE, POWERHOUSE AND EMBANKMENT
SHOESTRING ROAD (RELOCATED)
SNAKE
RIVER
KING HILL MAIN CANAL
SHOESTRING ROAD (EXISTING)
SHOESTRING ROAD REALIGNMENT

Figure 2-4, A.J. Wiley proposed construction phase and Shoestring Road relocation (Source: Idaho Power Company, 1981b, Application, Exhibit L).

2.1.2.4 Transmission Facilities

A 3-mile-long transmission line would transport project energy to the Applicant's existing transmission line south of the project site (Figure 2-1). The transmission line would be 65 feet high, of two-pole wood, H-frame construction, spaced approximately 600 feet apart. Where necessary, depending on final route location and land use, a single-pole line with 300-foot span length would be used.

Three 397.5 MCM ACSR conductors would be installed to carry the full output of the Wiley powerplant. The circuit would be protected by two 5/16-inch, HS, galvanized, strand-steel-shield wires. This line would be designed for and operated at 138 kV (line to line voltages).

2.1.2.5 Proposed Recreational Facilities

According to the Recreational Use Plan (Exhibit R) submitted as part of the application, Applicant examined existing recreational opportunities and use in the area and determined that recreational development at the proposed project should be oriented towards local use, and would depend on the quality of hunting and fishing opportunities to be made available. Intensive recreational development was not deemed compatible with the purpose of the fish and wildlife mitigation programs. (See Sections 4.1.5 and 4.1.6.) The proposed project lands were analyzed according to accessibility, environmental suitability, existing land ownership patterns, and relationship to the proposed fish and wildlife mitigation areas. As a result, six areas were chosen for development. (See Figures 2-5, 2-6, and 2-7.) In addition, hunting-fishing easements are planned along the reservoir shorelines.

Table 2-1 summarizes the sizes of the proposed recreational areas and the estimated number of recreationists that could be accommodated at any one time. Applicant utilized the concept of development levels to indicate the extent of the proposed development.

A. Wiley damsite--Parking for 5 cars and visitor information display. Fishing access at base of dam. (See Figure 2-5.)

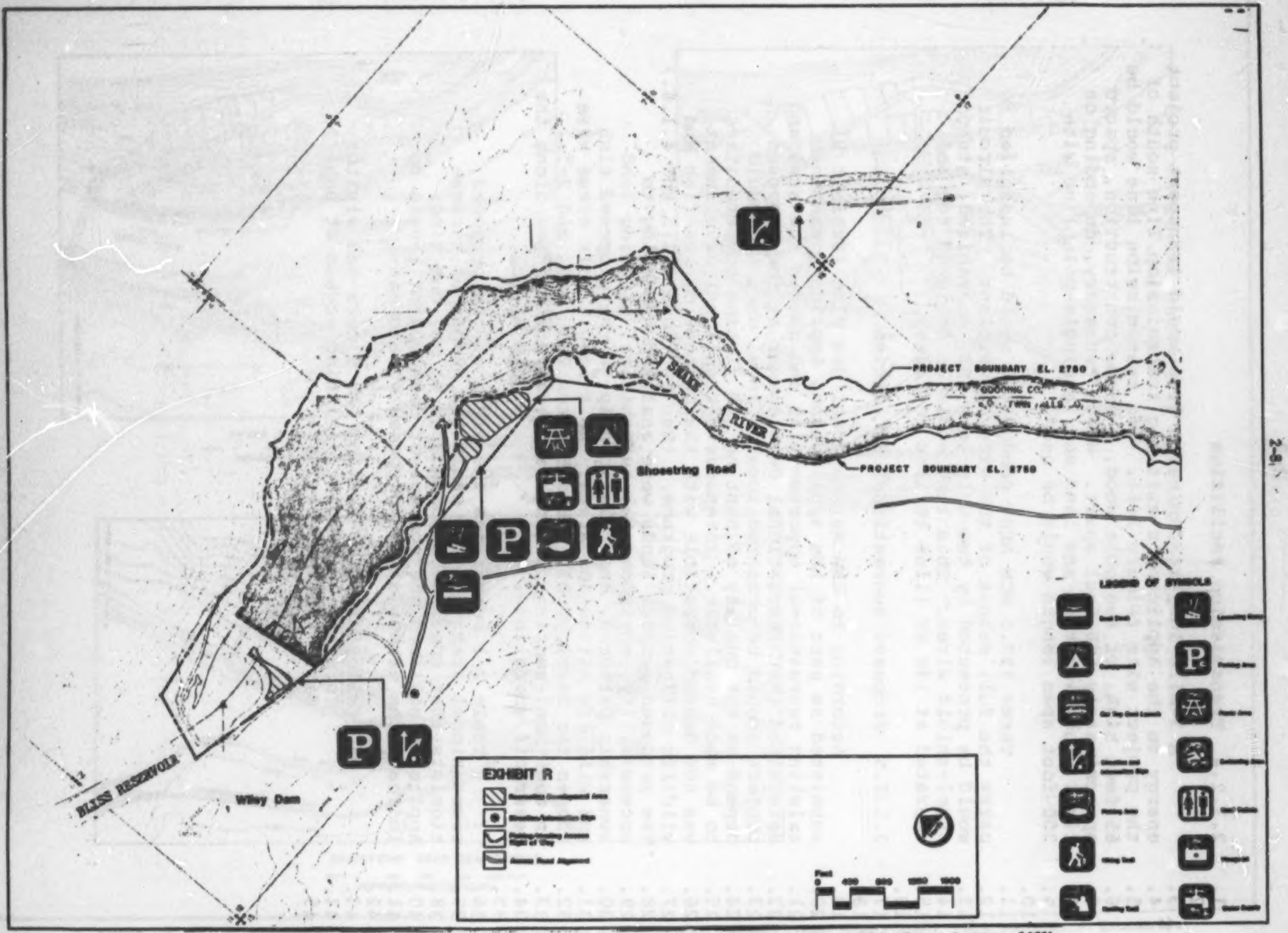
PROJECT BOUNDARY EL. 2780
PROJECT BOUNDARY EL. 2780
SNAKE
RIVER
Shoestring Road
BLISS RESERVOIR
Wiley Dam
EXHIBIT R
Feet
0
400
800
1200
1600
LEGEND OF SYMBOLS

Figure 2-5. Proposed recreational plan in the Wiley Dam-Shoestring road area (Source: Idaho Power Company, 1981b,

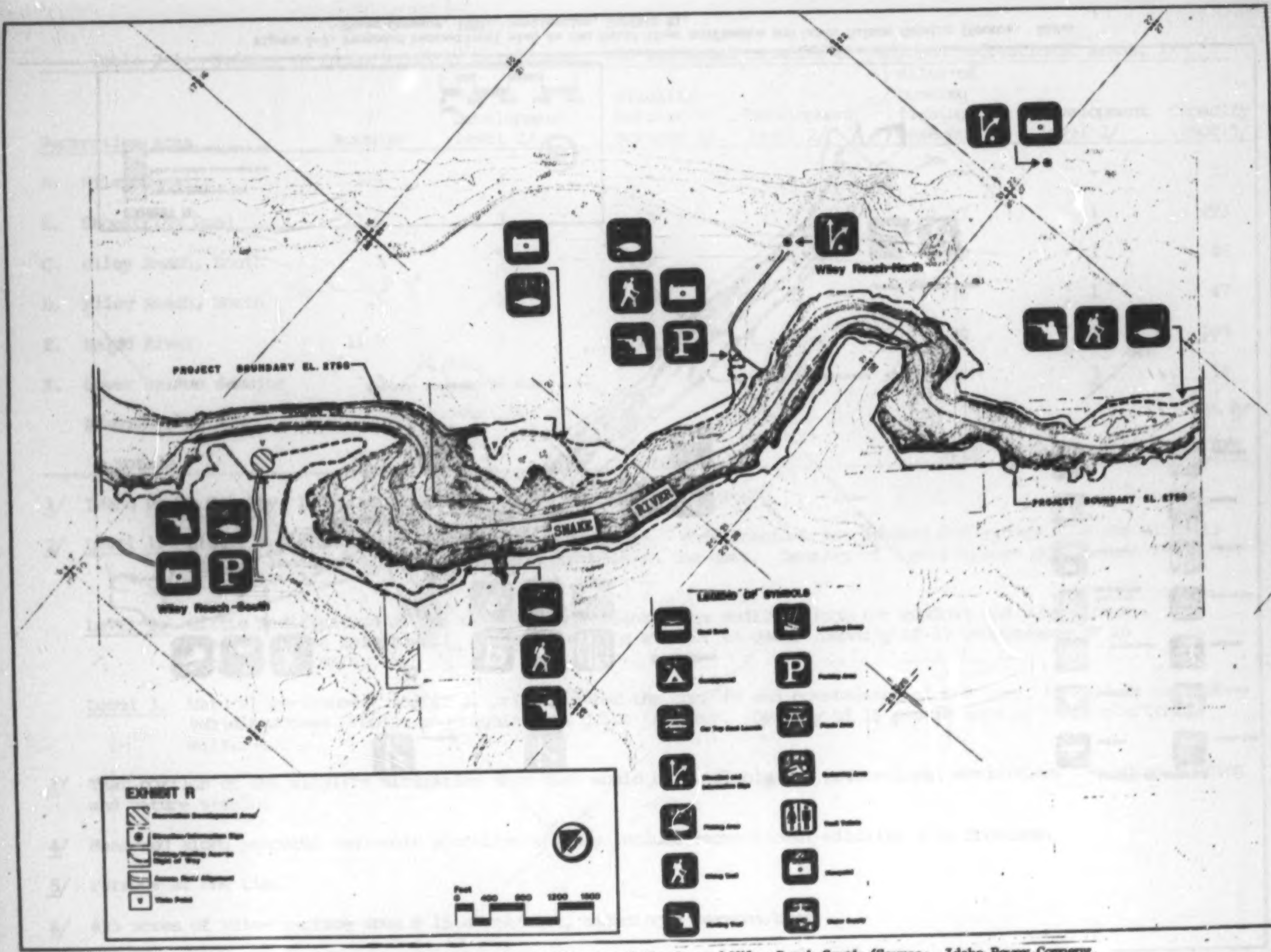
PROJECT BOUNDARY EL. 2780
PROJECT BOUNDARY EL. 2780
Wiley Reach-North
Wiley Reach-South
SNAKE
RIVER
LEGEND OF SYMBOLS
Boat Dock
Campground
Car Top Boat Launch
Direction and Information Signs
Fishing Area
Hiking Trail
Hunting Trail
Launching Ramp
Parking Area
Picnic Area
Swimming Area
Vault Toilets
Viewpoint
Water Supply
EXHIBIT R
Recreation Development Area
Direction Information Sign
Fishing/Hunting Access Right of Way
Access Road Alignment
Vista Point
Feet
0
400
800
1200
1600

Figure 2-6. Proposed recreational plan in Wiley Reach North and Wiley Reach South (Source: Idaho Power Company, 1981b, Application, Exhibit R).

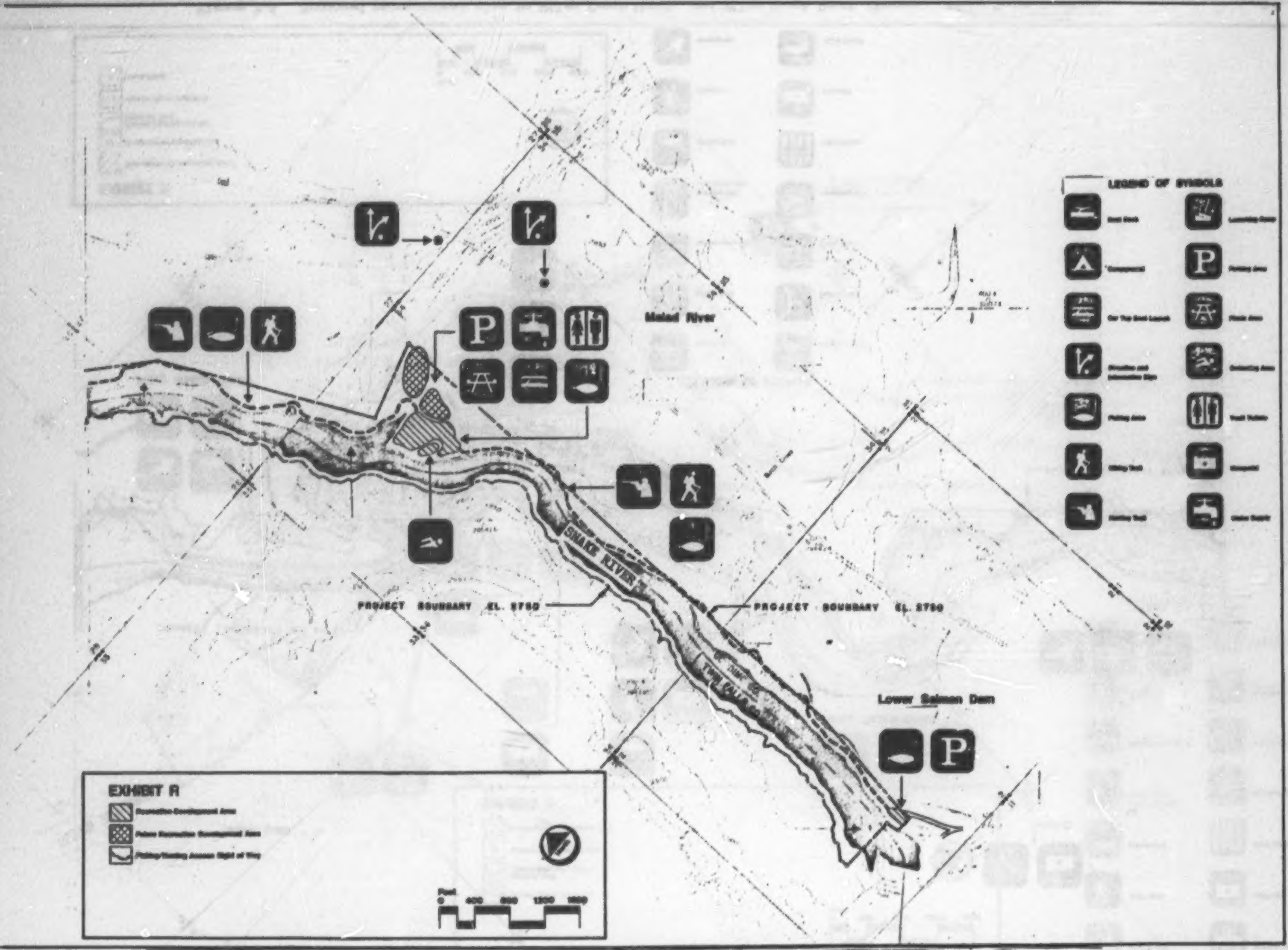
LEGEND OF SYMBOLS
Malad River
SNAKE RIVER
PROJECT BOUNDARY EL. 2750
PROJECT BOUNDARY EL. 2750
Lower Salmon Dam
EXHIBIT R
Feet
0
400
800
1200
1600

Figure 2-7. Proposed recreational plan in the Malad River confluence and Lower Salmon damsite (Source: Idaho Power Company, 1981b, Application, Exhibit R).

Table 2-1. Summary of size, level of development, and estimated capacity of proposed recreational areas. 1/

Recreation area	Acreage	Development level 2/	Wildlife habitat acreage 3/	Development level 2/	Miles of hunting fishing easement 4/	Development level 2/	Capacity (PAOT)5/
A. Wiley damsite	1.0	3	-	-	-	-	15
B. Shoestring Road	12.0	3	4	1	1.17	1	193
C. Wiley Reach, South	.5	1	20	1	1.00	1	46
D. Wiley Reach, North	.5	2	20	1	.76	1	47
E. Malad River	11.0	3	10	1	1.00	1	189
F. Lower Salmon damsite	.5	2	-	-	1.25	2	14
Reservoir waters							125 6/
Totals	25.5		54.0		5.18		629

1/ Idaho Power Company, 1981b, Application, Exhibit R, modifed by Staff.

2/ Level 1. Little modification of the natural environment. Modifications for comfort and convenience are minimal. Vehicle access restricted. Minimum controls on the user. Density of 2 people/acre or 4 people/trail mile.

Level 2. Little modification of the natural environment. Few modifications for comfort and convenience. Vehicle access unimproved. Minimum controls evident to user. Density of 15 people/acre or 15 people/trail mile.

Level 3. Natural environment modified, primarily for the comfort and convenience of the user, to include ease of vehicle access. Rules and regulations guide the user. Density of 15 people/acre or 15 people/trail mile.

3/ That portion of the wildlife mitigation area that would be available for recreational activities, including hunting and nature viewing.

4/ Measured along proposed reservoir shoreline and may include recreational-wildlife area frontage.

5/ Persons at one time.

6/ 625 acres of water surface area @ 15 acres/boat, assuming 3 persons/boat.

B. Shoestring Road--Boat ramp and dock; 5 picnic units and 15 camping spaces; 2 vault toilets; water supply. Day-use parking for 15 cars and space for 10 cars and trailers. Area has the potential to be expanded with 15 additional camping spaces, 2 additional vault toilets and additional day-use parking for 10 cars and 10 cars and trailers. (See Figure 2-5.)

C. Wiley Reach, South--Access road and parking for 5 cars; hunting-fishing access. (See Figure 2-6.)

D. Wiley Reach, North--Parking for 10 cars; hunting-fishing access. (See Figure 2-6.)

E. Malad River confluence--Parking for 20 cars; 15 picnic units; playfield; 2 vault toilets; water supply; swimming access; hunting-fishing access. Area has the potential to be expanded with 15 additional picnic units and parking for 20 additional cars. (See Figure 2-7.)

F. Lower Salmon damsite--Parking for 10 cars; hunting-fishing access. (See Figure 2-7.)

Because of the limited width of the proposed reservoir and a potential conflict with fishing and wildlife management programs, Applicant has proposed a boat speed limit of 10 mph, or a boat motor horsepower restriction. The initial recreational development would be completed at the time the reservoir would be filled. The recreational facilities would be constructed and operated by Applicant. Additional development at the two areas with a potential for expansion would be indicated by use in excess of 95 percent capacity for 20 days or more of any 1 year, excluding 3-day holidays. The recreational plan would be subject to reassessment at 5-year intervals.

2.1.2.6 Land Requirements

The project, as proposed, would occupy a total of 949.5 acres, including approximately 915 acres necessary for construction of dam, reservoir, and access road. The transmission line would occupy 34.5 acres.

A total of 215 acres of Federal lands would be affected by the project. The remaining lands are owned by the following: State of Idaho, 241 acres; private citizens, 402.5 acres; and the Applicant, 91 acres.

2.1.2.7 Spoil and Borrow Areas

Excess material excavated during construction of the project would be deposited in three spoil areas (Figure 2-8). The area designated S-1 is able to hold 1.4 million cubic yards of spoil material excavated from the right abutment of the dam. The area designated S-2, located on both banks of the river, can hold 600,000 cubic yards of material. Area S-2 would be submerged when the reservoir is filled. Area S-3 has a capacity to hold 3.5 million cubic yards of spoil material and would have sufficient capacity for all waste material or about 1.75 million cubic yards.

Potential borrow areas that would be used as sources of concrete aggregates are also shown on Figure 2-8. Part of borrow area B-1 would be submerged when the reservoir is filled.

2.1.3 Work Force Requirements

Table 2-2 illustrates monthly projections for construction workers over the 27-month schedule. The major peak demand would reach 334 in the latter half of the second year. Hourly laborers are expected to be recruited from the surrounding area, with the contractor bringing a small group of permanent employees from outside the area. Workers would provide their own living accommodations, although some temporary housing could be provided at the project site if necessary.

Table 2-2. Projections of construction work force. 1/

Month	First year	Second year	Third year
January	-	207	276
February	-	249	214
March	-	272	149
April	-	298	120
May	-	305	99
June	-	317	77
July	88	329	65
August	101	331	55
September	112	333	41
October	118	334	-
November	143	327	-
December	175	320	-

1/ Idaho Power Company, 1981b, Application, Exhibit W.

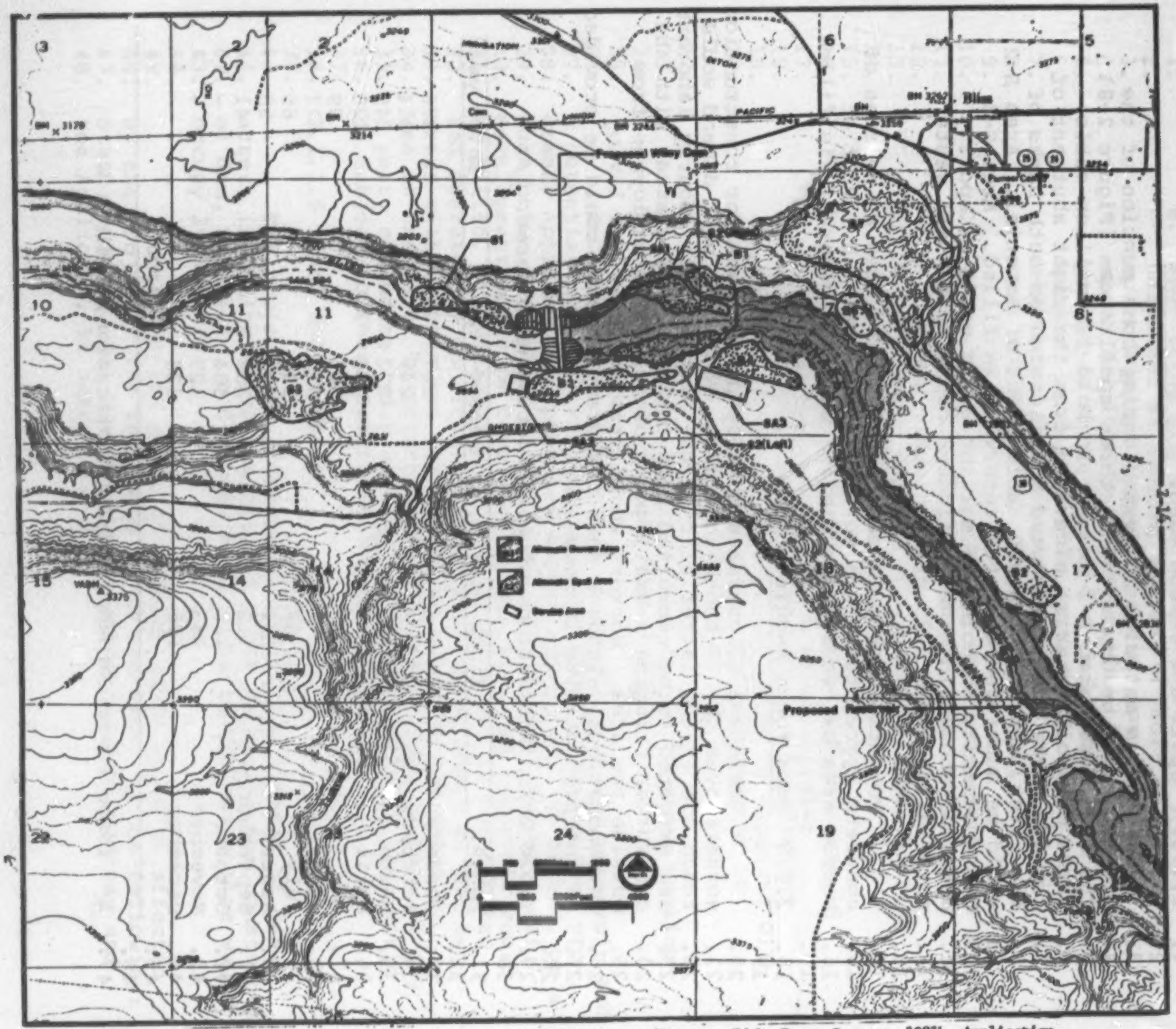
Bliss
Proposed Wiley Dam
Proposed Reservoir
PACIFIC
SHOESTRING
SA3
SA2
Alternate Borrow Area
Alternate Spoil Area
Service Area
3
2
6
5
8
10
11
15
14
17
18
19
22
23
24

Figure 2-8. A.J. Wiley proposed spoil, borrow, and service areas (Source: Idaho Power Company, 1981b, Application, Exhibit W).

2.1.4 Construction Schedule and Procedures

The construction of the project would require approximately 28 months from the award of the construction contract (Figure 2-9). The construction would be accomplished in two major phases, as follows:

Phase I--Phase I would comprise construction of the spillway, the diversion facilities, and the gravity section of the dam on the right abutment. The relocation of Shoestring Road, including the construction of a new bridge across the Snake River, would also be accomplished during this phase.

The first task of the contractor, following mobilization, would be to build the Phase I cofferdam, using locally available material. Relocation of Shoestring Road, right-bank excavation, and installation of the concrete plant would proceed simultaneously. Near the end of the second year of the project, the first concrete would be placed in the spillway.

During the first half of the third year, the contractor would complete construction of the spillway, the stilling basin, the gravity section of the dam, and the approach and discharge channels. The Phase II cofferdam would also be completed in this period, permitting the Phase II diversion to take place about 28 months after the start of implementation (Figure 2-9).

Phase II--This phase would comprise the construction of the intake-powerhouse structure and the embankment, and the installation of the turbines, the generators, and all other mechanical and electrical equipment.

The contractor would complete excavation on the left abutment and in the river channel 4 months after completing the Phase II diversion. Work on the counterfort retaining wall, the intake-power-house structure, and the embankment would proceed more or less simultaneously, and would be completed early in the fourth year. Delivery of turbines, generators, and other major equipment would start in the middle of the third year, and their installation would proceed immediately. Remedial work along the reservoir rim would also be completed in that year. Final closure of the river diversion would take place early in the fourth year. The openings in the spillway would be closed by gates and backfilled with concrete, and the reservoir would be filled.

The first unit would be in operation 41 months after the start of final design. The remaining two units would follow at 2-month intervals. Thus, all three units would be on-line 45 months after the start of final design (Figure 2-9).

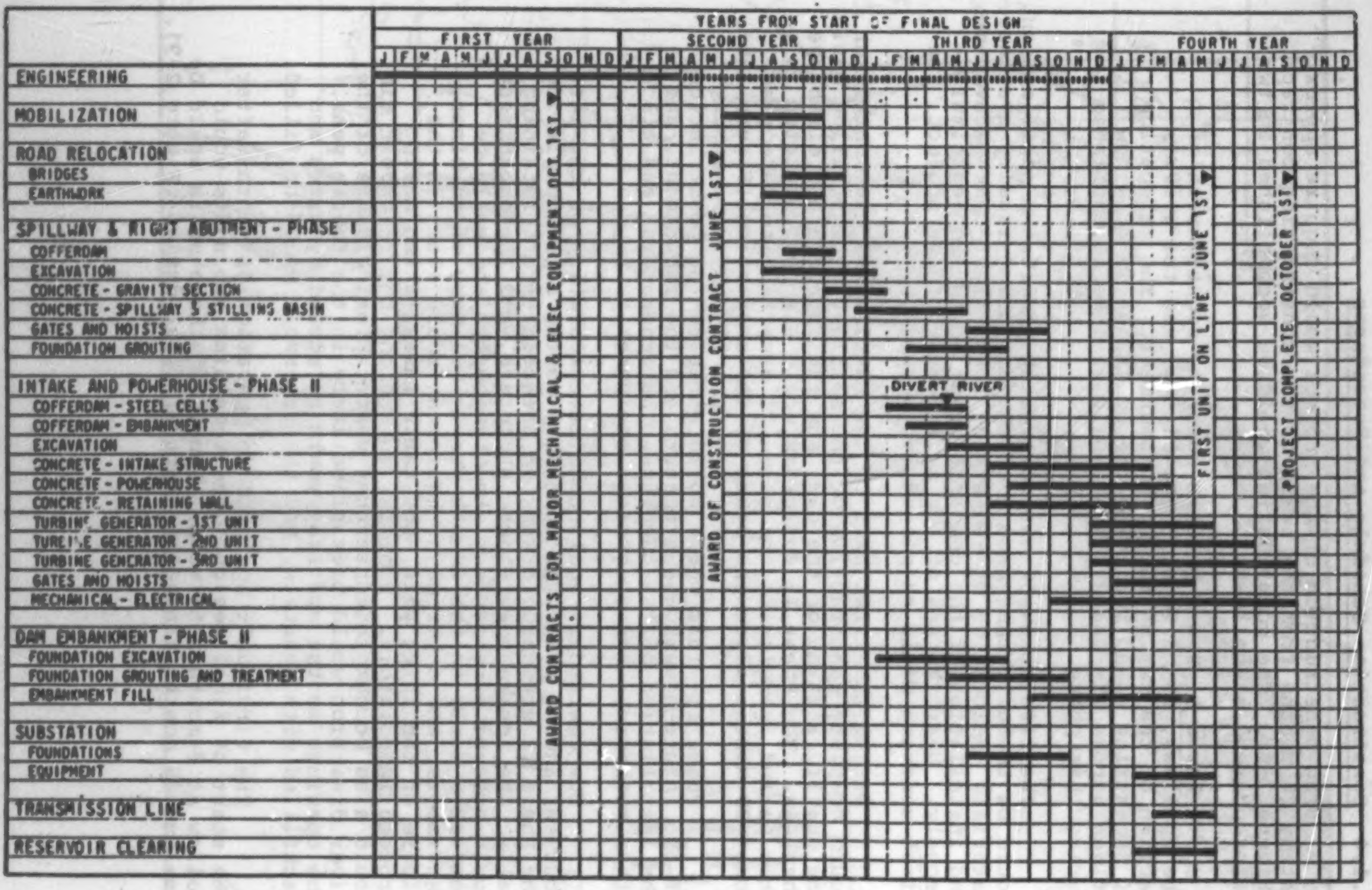

Figure 2-9. A.J. Wiley proposed construction schedule (Source: Idaho Power Company, 1981b, Application, Exhibit O).

2.1.5 Schedule of Operation and Maintenance

The Wiley Project would be operated on a run-of-river basis, with the reservoir maintained at an elevation of 2,735 feet at all times. The project's operation would be coordinated with the operation of the the Lower Salmon Falls Project, which is just upstream.

Routine maintenance of project facilities would be accomplished by regularly scheduled visits by the Applicant's personnel. This would include inspection and debris removal from all intake structures and spillways, and annual shutdown of the generating units for scheduled maintenance and repairs. During the first year of operation, additional shutdowns would be made in order to perform minor adjustments, as needed.

2.1.6 Safety Inspections

The FERC staff inspects licensed hydroelectric projects both during and after construction, to ensure the physical safety of the project and the safety of the public, including that of recreational users, and to ensure that the licensee complies with any special construction and operating requirements of the license. Generally, all constructed hydroelectric projects are inspected annually by an engineer from the FERC Regional Office San Francisco, California. The engineer observes the general condition of the project structures, looking particularly for any evidence of leakage or structural deterioration that might affect safety. Warning signs, protective fencing, and upstream and downstream safety devices are observed, and suggestions are made for any necessary improvements. In addition, every 5 years, the licensees of major projects are required to have their structures inspected and evaluated by an independent consultant experienced in the design and construction of hydroelectric projects. The consultant's report, which is limited to the safety of the project, is submitted to the Commission for review.

2.1.7 Compliance with Applicable Laws and Regulations

In order to construct, operate, and maintain the proposed project, Applicant would have to obtain the following Federal and state permits and authorizations:

Federal

1. Section 10 Permit--Corps of Engineers
2. Hydroelectric License--Federal Energy Regulatory Commission
3. Easement or permit use of public lands--Bureau of Land Management

State

1. Certificate of Public Convenience and Necessity--Idaho Public Utilities Commission
2. Water Use Permit--Department of Water Resources
3. Section 401 Certification (Water Quality Certification)--Department of Health and Welfare
4. Various collection permits--Department of Fish and Game
5. Utility right-of-way and easement for transmission line--Department of Lands
6. Building permit, electrical permit plot plan approval--Department of Labor and Industrial Relations

2.1.8 Future Development

Construction of the Wiley Dam and powerhouse and the installation of generating facilities would develop the total head available between the Applicant's downstream Bliss and upstream Lower Salmon Falls Projects, FERC Projects Nos. 1975 and 2061, respectively.

2.1.9 Design Limitations

2.1.9.1 Seismic Risk Evaluation

The project area is located mostly on the Snake River Group in an area of low-level seismicity. A plot of the 45 historical earthquakes recorded since 1901 in a radius of 100 miles from the proposed damsite is shown on the earthquake epicenter map (Figure 2-10).

As shown on Figure 2-10, 37 of the 45 earthquakes have occurred in the Salmon River Mountains approximately 80 miles north of the proposed Wiley Site. Table 2-3 indicates that 14 of the earthquakes were strong enough to be felt at the proposed site and 3 resulted in reports of some damage. None of the earthquakes were considered major seismic events that produced extensive damage or loss of life. The nearest epicenter to the proposed project site was located approximately 25 miles east of the Wiley Damsite. The event occurred on November 11, 1905, and was given a rating of VII on the Modified Mercalli Intensity scale.

According to the Seismic Probability Map of the United States developed by Algermissen and Perkins (1976), the Wiley site is located in an area of low-to-moderate seismic risk. Also, the 1976 edition of the Uniform Builder Code Seismic Zone Map of the United States shows the proposed project site to be located in zone 2, a zone of potential moderate earthquake damage. In zone 2, a seismic design coefficient of 0.05g is recommended.

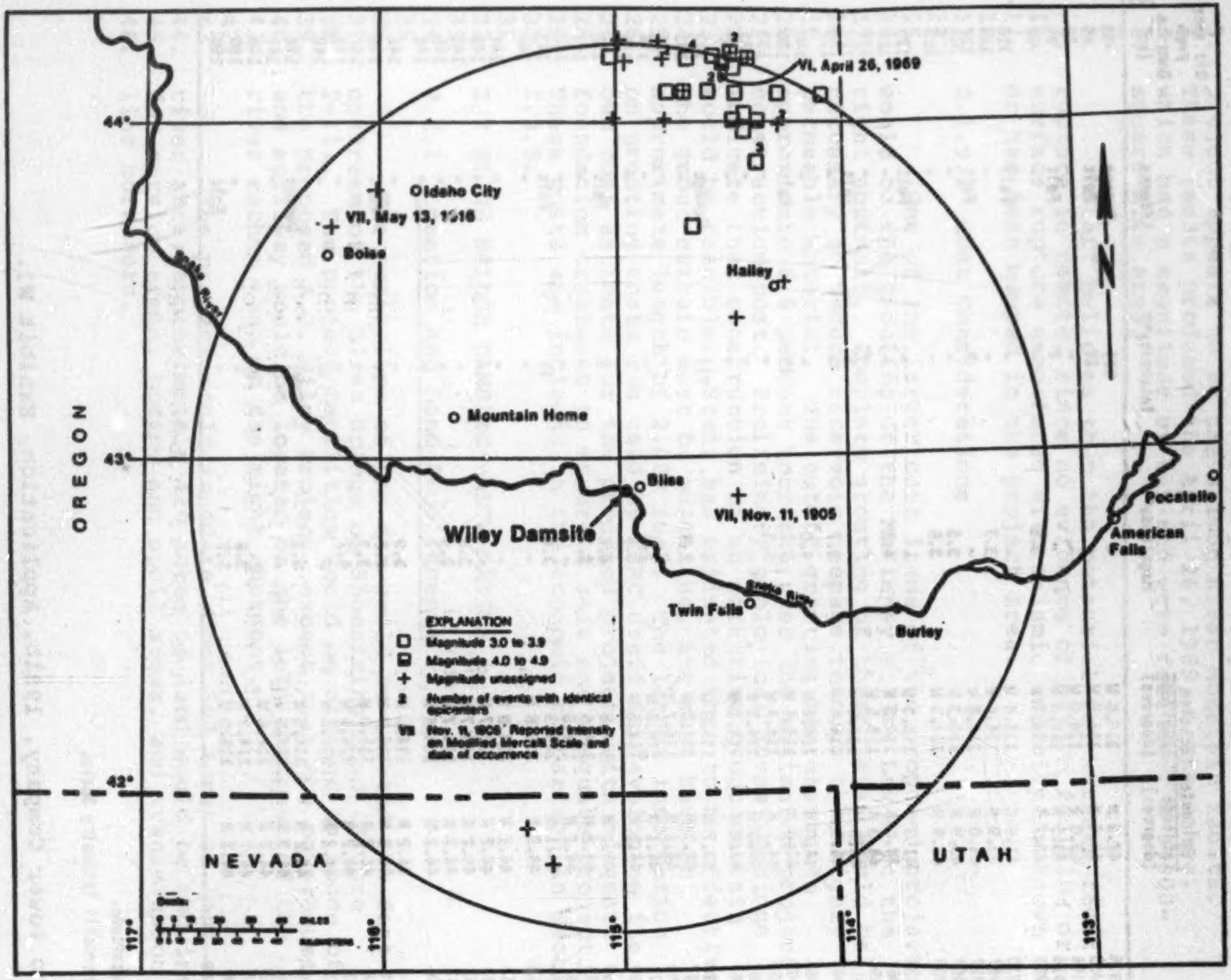
OREGON
NEVADA
UTAH
44°
43°
42°
117°
116°
115°
114°
113°
N
Idaho City
VII, May 13, 1916
Boise
Snake River
Mountain Home
Bliss
Wiley Damsite
VII, Nov. 11, 1905
Hailey
VI, April 26, 1969
Twin Falls
Burley
American Falls
Pocatello
EXPLANATION
Magnitude 3.0 to 3.9
Magnitude 4.0 to 4.9
Magnitude unassigned
Number of events with identical epicenters
VII Nov. 11, 1905 Reported intensity on Modified Mercalli Scale and date of occurrence
Scale
MILES
KILOMETERS

Figure 2-10. Earthquake epicenters (Source: Idaho Power Company, 1981b, Application, Exhibit W).

Table 2-3. Recorded earthquakes within 150-kilometer radius of Wiley Damsite. 1/

Date	Epicenter Location Latitude (degrees)	 Longitude (degrees)	Magnitude*	Intensity**	Effects	Distance From Damsite (km) 2/
Nov. 11, 1905	42.9 N	114.5 W	-	VII	Damage	38
Aug. 08, 1963	43.4 N	114.5 W	-	IV	Felt	66
Feb. 01, 1954	43.0 N	114.0 W	-	-	-	79
Sep. 10, 1916	43.5 N	114.3 W	-	V	Felt	85
Sep. 21, 1963	43.7 N	114.7 W	3.5	-	-	91
Nov. 16, 1930	41.9 N	115.4 W	-	-	Felt	118
Dec. 23, 1967	43.9 N	114.4 W	3.7	-	-	119
Apr. 20, 1917	44.0 N	114.8 W	-	V	Felt	122
Nov. 17, 1967	43.9 N	114.3 W	3.5	-	-	123
Jan. 02, 1968	43.9 N	114.3 W	3.6	-	-	123
Dec. 09, 1930	41.8 N	115.3 W	-	-	Felt	126
Nov. 11, 1967	44.0 N	114.5 W	4.1	-	-	127
Aug. 18, 1956	44.0 N	115.5 W	-	-	-	129
May 26, 1916	43.8 N	116.0 W	-	V	Felt	129
Dec. 23, 1967	44.0 N	114.4 W	3.7	-	-	130
Nov. 01, 1968	44.0 N	114.4 W	4.0	-	-	130
July 20, 1968	44.0 N	114.4 W	3.1	IV	Felt	130
May 02, 1969	44.1 N	114.7 W	3.6	-	-	131
July 03, 1967	44.0 N	114.3 W	-	-	-	133
July 10, 1967	44.0 N	114.3 W	-	-	-	133
May 13, 1916	43.7 N	116.2 W	-	VII	Damage	133
Aug. 13, 1967	44.1 N	114.8 W	3.8	-	-	133
June 12, 1964	44.1 N	114.7 W	-	-	-	134
Jan. 22, 1971	44.1 N	114.6 W	3.8	-	-	134
June 03, 1969	44.1 N	114.6 W	3.7	-	-	135
May 05, 1969	44.1 N	114.5 W	4.6	V	Felt	138
May 31, 1969	44.2 N	114.6 W	3.3	-	-	142
May 28, 1967	44.2 N	114.5 W	-	-	-	143
Apr. 17, 1964	44.1 N	114.3 W	3.6	IV	Felt	143
Sep. 15, 1963	44.2 N	114.8 W	-	-	-	144
Oct. 27, 1963	44.2 N	114.8 W	-	-	-	144
Sep. 11, 1963	44.2 N	114.7 W	-	-	-	145
Aug. 13, 1967	44.2 N	114.7 W	3.8	-	-	145
Sep. 23, 1967	44.2 N	114.7 W	3.9	-	-	145
Sep. 12, 1964	44.2 N	114.6 W	-	-	-	146
Apr. 29, 1968	44.2 N	114.6 W	3.8	-	-	146
Apr. 22, 1969	44.2 N	114.6 W	3.6	IV	Felt	146
Aug. 30, 1968	44.2 N	115.0 W	3.7	-	-	147
Sep. 12, 1963	44.2 N	114.5 W	4.1	-	-	148
Sep. 25, 1963	44.2 N	114.5 W	-	-	-	148
Apr. 26, 1969	44.2 N	114.5 W	4.9	VI	Damage	148
Aug. 31, 1968	44.3 N	114.9 W	-	-	-	149
May 02, 1967	44.2 N	114.6 W	-	-	-	149
Nov. 18, 1964	44.1 N	114.1 W	3.6	-	-	150
Nov. 01, 1976	14.3 N	115.0 W	3.7	-	Felt	150

* Richter Magnitude.

** Modified Mercalli Intensity Scale.

1/ Idaho Power Company, 1981b, Application, Exhibit W).

2/ kilometer equals 0.26 mile.

Based on the historical records of seismicity, the most significant source of large earthquakes nearest the project appears to be the Salmon River Mountain faults. These faults produced the April 26, 1969, earthquakes, which had a magnitude of 4.9 and were felt over a 9,000-square-mile area.

Staff believes that the potential for surface fault rupture is remote, since no evidence of active faulting or surface rupture associated with seismic activity is known or has been mapped in the project area.

2.1.9.2 Cost Considerations

One of the larger cost items of the proposed project would be the grouting of the McKinney Pillow Lavas in the right abutment. Complete grouting of these lavas would be necessary to reduce reservoir seepage through this highly permeable material. The cutoff grouting represents an approximate 8.6 percent increase over the estimated project construction cost. Preliminary geological investigations indicate that construction of an effective grout curtain would be feasible. Staff has estimated that to be effective, the grout curtain must be multiline, and must have an approximate length of 2,000 feet. The latest information on grouting costs was used by FERC staff in developing its own cost estimate for the proposed project, with adequate foundation treatment to ensure a safe and adequate project. These costs are included in the economic comparison in Section 1.3.5.

2.2 BLISS BRIDGE DAMSITE--ALTERNATIVE 1

2.2.1 Location and Land Requirements

The centerline of the dam would be located 300 feet upstream of the Bliss Bridge on Shoestring Road (Figure 2-11). The project facilities would be similar to those of the proposed A.J. Wiley Project, except that the powerhouse and spillway would be located on the left abutment of the river rather than on the right abutment.

The project would inundate about 500 acres of land and river area; approximately 410 acres of land would be required for service areas, borrow and spoil areas, and transmission line corridors.

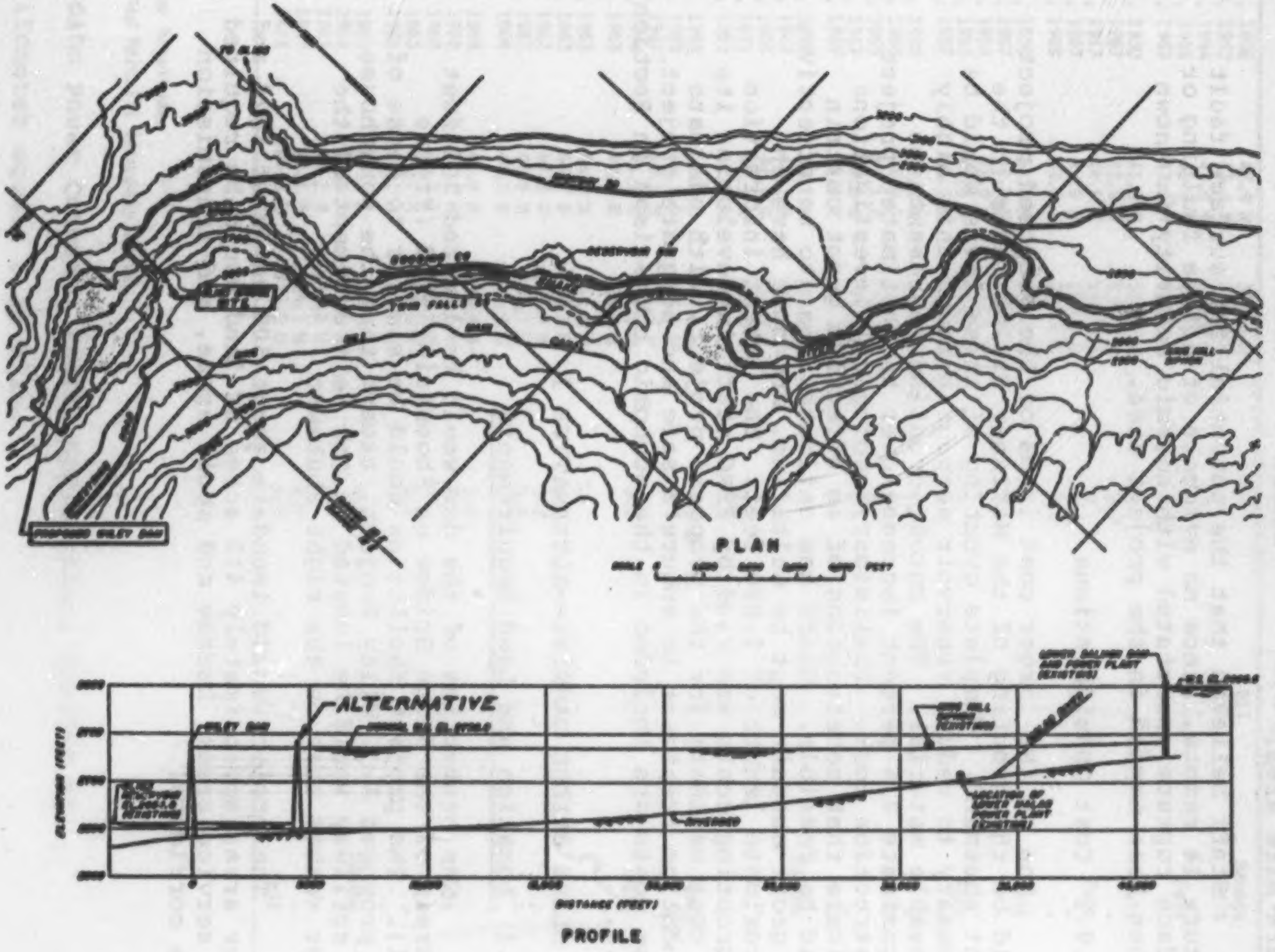
PLAN
TWIN FALLS CO
GOODING CO
ALTERNATIVE
DISTANCE (FEET)
PROFILE

Figure 2-11. Location of Bliss Bridge alternative site (Source: FERC staff).

2.2.2 Access Facilities

Access to the Bliss Bridge alternative site would be via Shoestring Road. Bliss Bridge would have to be relocated to a point approximately 1,000 feet downstream from its present location to reduce conflicts with local traffic and to allow sufficient clearance for tailrace channel construction below the powerhouse. The bridge relocation would necessitate minor road realignment and relocation.

2.2.3 Construction Requirements

Construction of the project at the Bliss Bridge site would proceed in the same manner as if the project were constructed at the Applicant's proposed site. The only significant difference in construction might be the absence of the grouting requirement necessary to seal off the right-abutment pillow lava at the proposed site.

2.2.4 Operation and Maintenance

The project would be operated on a run-of-the river basis at the Bliss Bridge site, with the reservoir maintained at elevation 2,735 feet, in the same manner as proposed in the application for license of the proposed A.J. Wiley Project.

The Applicant's personnel would conduct routine maintenance of the project facilities during regularly scheduled visits. Maintenance would include inspecting the intake structures and spillways, removing debris, and shutting down the generating units for scheduled maintenance and repair. During the first year of operation, additional shutdowns would be made if minor adjustments are necessary.

2.3 COAL-FIRED, STEAM-ELECTRIC PLANT--ALTERNATIVE 2

2.3.1 Location and Land Requirements

Staff assumes for the purpose of comparison that the coal-fired steam plant would be located in south central Idaho, approximately 2 miles east of Bliss, on land managed by the Bureau of Land Management of the U.S. Department of the Interior. The plant would be served by the adjacent Union Pacific Railroad, and is approximately 480 rail-miles from the Black Butte Coal Mine in Wyoming, the assumed source of fuel. The site is underlain by the Snake River Plain Aquifer and is approximately 2.5 miles from the Snake River; both the aquifer and the river are possible sources of make-up water supply for the steam plant. A 230-kV transmission line passes through the site.

Staff estimates that the plant would require a total of 500 acres, including about 210 acres for haul roads, parking lots, and space between components. The following is a list of space requirements for individual components of the steam plant, totaling 290 acres:

Component	Acreage
° Main powerplant unit (including stack, scrubber, bag house, boiler, final boiler feed water treatment, turbine and generator, and main transformer), cooling tower, fuel-oil storage, and miscellaneous storage.	33
° Coal yard for dead storage pile, evaporation pond for the coal-pile runoff, and loop railroad system.	20
° Reagent processing plant to treat limestone for flue gas desulfurization (FGD) system.	50
° Solid-waste disposal site for bottom ash and fly ash.	127
° Settling pond for water coming from ash disposal site.	25
° High-quality holding pond for filter backwash and rinse, and boiler blowdown from main plant.	2
° Evaporation pond for plant startup wastes, demineralizer regenerant wastes, sanitary sewage treated effluent, lime-softener-clarifier wastes, floor and roof drains, bottom-ash sluicing blowdown, and boiler cleaning wastes.	
° Raw-water reservoir capable of holding a 10-day supply.	20

In addition, plant systems would include: a 600-foot-high stack; water supply line or well system; water treatment system and treated water storage tank; boiler feedwater treatment system; bottom ash and wastewater ponds; coal unloading, conveyance, and storage facilities; wastewater treatment system and discharge pipe; scrubber sludge dewatering, stabilization, and disposal system; switchyard; transmission lines; railroad spur and plant loop; and administration building.

The steam generator would be a dry-bottom, balanced draft, pulverized-coal-fired, drum-type boiler. Number 2 fuel oil would be used for ignition firing. The steam generator design superheater flow would be 950,000 pounds per hour (lb/hr) at 2,495 pounds per square inch gage (psig) maximum and 1,005 °F. Design reheater flow is 1,750,000 lb/hr at 543 psig and 1,005 °F outlet conditions.

The condensers would transfer the unrecoverable heat of vaporization from the turbine exhaust steam to the circulating water. The unit would use a recirculating cooling water system that would convey the hot circulating water from the condensers to evaporative cooling towers, which would dissipate the waste heat to the atmosphere by evaporative heat transfer. The cooled water would be recirculated from the tower basin to the condensers for reuse.

At a nameplate capacity of 250 MW, the unit's auxiliaries (including air-pollution control equipment and flue gas reheat) would require approximately 30 MW of power, which would result in a net generating capacity of 220 MW. The net plant heat rate would be 9,400 British thermal units (Btu) per kWh at nameplate generation capacity. The maximum generating capacity of the proposed units would be approximately 260-MW gross generation with turbine valves wide open and a pressure of 2,400 psig.

2.3.2 Construction

A 250-MW, coal-fired steam plant would require from 400 to 800 workers during the construction phase of the project. The construction period would be approximately 5 years.

2.3.3 Operation and Maintenance

The coal-fired steam plant would operate at a plant factor of approximately 70 percent, providing the Applicant with 1,533 GWh of energy. The forced outage rates would be higher than the proposed hydroelectric project. Additionally, scheduled maintenance would occur about 1 month per year, more than required for hydroelectric plant maintenance. Thermal efficiency of coal-fired steam plants is typically 35 percent.

The generation of 1,752 GWh of energy, 80 percent of the plant's total capacity, would require 651,000 tons of coal annually. Coal would be shipped by the Union Pacific Railroad in unit trains of approximately 85 100-ton cars per train. The coal would be mined at the Black Butte Mine in Wyoming, about 480 rail-miles from the Bliss site. Coal would be blended at the mine site, resulting in a sulfur content that would meet Environmental Protection Agency (EPA) air quality requirements when burned, at a scrubber-equipped, coal-fired steam plant.

A water supply of about 10 cfs would be required for cooling purposes and various consumptive uses in the generation processes.

The plant would require about 38,000 tons of limestone per year for the FGD system. The limestone would be stored in an outdoor pile above a reclaim pit. The reclaim conveyor would deliver the limestone to day-storage silos located above the FGD system's ball mill pulverizers. Approximately 6 tons per hour would be required for operation of the FGD system.

Electrostatic precipitators would be used for removal of particulates. These precipitators are expected to remove in excess of 99.5 percent of the particulate ash (fly ash) that would be disposed of at the solid-waste disposal site within the project area.

Periodic blowdowns from the circulating cooling water system, cooling towers, and boilers would be discharged into the wastewater pollution control system. This system would also accept discharges of water treatment and demineralizer wastes, plant drains, equipment cleaning wastes, bottom-ash sluice water, material storage, area runoff, and sanitary wastes.

The bottom ash would be collected in a wet hopper below the furnace. Periodically, the ash would be withdrawn, using water-jet eductors, and discharged to the ash ponds via a pipeline. Economizer ash and coal pulverizer-mill rejects (pyrites) would be collected in the same manner and discharged to the ash pond via the same pipeline. Water for the transport of ash would be recirculated from the ash pond. Excess ash pond effluent would be routed to the central wastewater treatment plant prior to discharge. An estimated 2.5 million tons of bottom ash, expected over the 35-year life of the plant, would be disposed of at the solid waste-disposal site within the project area.

2.3.4 Environmental and Safety Controls

All construction would be carried out in accordance with the requirements of the Occupational Safety and Health Administration (OSHA), EPA, and any other pertinent laws and regulations, to ensure worker safety, and to limit airborne particulates and gases, noise, and erosion. Operation and maintenance would be conducted in compliance with applicable regulations for protecting air and water quality, and human safety. As discussed later in Sections 4.3.1 and 4.3.6, however, compliance with the regulations may not prevent degradation of air and water quality, and its far-reaching effects.

2.4 NO ACTION--ALTERNATIVE 3

The no-action alternative would constitute a denial of a license to construct, operate, and maintain the A.J. Wiley Hydroelectric Project, as proposed by the Applicant. This alternative would result in the nonutilization of potential electric energy that could be derived by developing the Wiley Reach, although existing and several additional small hydro projects would generate some power.

The no-action alternative would provide the public with continued use of this reach of the Snake River; hence, the wildlife, vegetation, recreational, aesthetic, archeological, and socioeconomic values of the river described in Section 3.1 would be maintained. These values may also be enhanced by recognition of the Wiley Reach as a National Natural Landmark, and as a potential nominee for inclusion in the Wild and Scenic Rivers System.

Section 3

THE AFFECTED ENVIRONMENT

The environment that would be affected by the construction and operation of the proposed A.J. Wiley Hydroelectric Project is discussed, as well as the environment that would be affected by Alternative 1 (Bliss Bridge damsite), Alternative 2 (coal-fired, steam-electric plant) and Alternative 3 (no action). The discussion includes meterological aspects, and land features, aquatic and terrestrial environments, recreation, visual resources, cultural resources, and socioeconomic factors.

3. THE AFFECTED ENVIRONMENT

3.1 PROPOSED A.J. WILEY PROJECT

3.1.1 Meteorology

3.1.1.1 Climate

The climate of the project area is semiarid and is characterized by hot, dry summers, cold winters, and windy springs. Average annual precipitation in the project area is approximately 10.5 inches. The average monthly precipitation is approximately 0.88 inch, whereas the average for the drier summer months is approximately 0.35 inch.

Prevailing winds are from the west during the late spring and summer months and from the east during the remainder of the year. During the late spring months, the intensity of the westerly winds is greater than during other times of the year.

3.1.1.2 Air Quality

The rural nature of the proposed project area provides for good-to-excellent air quality. The nearest air quality monitoring station is located at Twin Falls, approximately 27 miles southeast of the site. Average annual concentration of total suspended particulates recorded at this station was found to be approximately 106 micrograms per cubic meter (ug/m^3); however, rural areas are not expected to exceed 40 ug/m^3. High levels of particulates are generated locally during periods of high winds. Ambient sulfur dioxide levels were recorded to be approximately 0.01 parts per million except in industrial areas. No data are available on the presence in the proposed project area of nitrous oxides, carbon monoxides, lead, and nonmethane hydrocarbons (Idaho Air Quality and Hazardous Materials Bureau, 1980).

3.1.1.3 Noise

Wind and rushing water are the primary sources of noise in the proposed project area. Some noise is generated by traffic on the nearby roadways. The Federal Highway Administration (1976) analyzed the noise generated along U.S. Highway 30, which passes through the project area, and found that a noise level of 60 decibels does not extend more than 170 feet from the highway. This noise level is not considered significant (Federal Highway Administration, 1976).

3.1.2 Land Features

3.1.2.1 Physiography and Topography

The proposed project would be located within the Snake River Canyon in the west-central Snake River Plain in southern Idaho. In the 8-mile-long stretch from the Lower Salmon Falls Dam downstream to the proposed project damsite, the canyon resembles a broad, steep-sided trench, cut into the surrounding plain. The Snake River flows within a second, smaller, steep-sided inner canyon, cut in the floor of the main canyon.

The main canyon is about 400 feet deep, and averages 1.2 to 1.5 miles in width at the rim. The floor of the main canyon has an average width of about 0.7 mile, and narrows to 0.5 mile at the proposed damsite. The narrowest part of the canyon rim (0.9 mile) is at the proposed damsite, while the widest point (2 miles) is 3.5 miles upstream.

The right wall of the main canyon is primarily a long cliff that is modified in two places: (1) the deep, narrow, steep-walled canyon of the Malad River that enters about 6.5 miles upriver from the proposed damsite, and (2) the 0.8-mile-wide, semicircular-shaped, steep, undulating slope area below Bliss, that has been called the Bliss landslide, located about 1 mile upstream from the proposed damsite. The somewhat less steep left canyon wall is extensively dissected by erosion, commonly in the form of gullies.

The depth of the inner canyon, from the terraces that comprise the main canyon floor to the river level, averages between 175 and 200 feet. The width of the inner canyon averages less than 1,000 feet at its rim, and is as narrow as 400 feet. The river channel, averaging about 300 feet in width, occupies most of the inner canyon bottom.

3.1.2.2 Geology and Soils

The geologic units at the project are part of a unique complex of basalt flows, pillow lavas, and river and lake sedimentary beds. This complex has resulted from repeated interruptions of the Snake River's entrenchment by episodes of volcanic eruption. Brief descriptions of the geologic units at the project are presented in Table 3-1, which shows the general stratigraphic sequence of the units with the youngest at the top. Figure 3-1 is a geologic map of the project area.

Table 3-1. General stratigraphic sequence of geologic units; youngest at top. 1/

Stratigraphic unit (map symbol) subunit (map symbol)	Description of pertinent features
Recent Deposits:	
Alluvium (Qal)	Stream deposits of silt, sand, and gravel.
Culluvium (Qco)	A mixture of loose rock debris and soil accumulated on slopes.
Landslide Debris (Qls)	Active and inactive landslide areas.
Loess (not shown in map)	Light-tan, poorly compacted, wind-deposited silt and fine sand. Forms a veneer over most of the area.
Melon Gravel (Qmg)	Well-rounded, poorly sorted basaltic sand matrix. Generally 5 to 20 feet thick. Occurs as enormous cross-bedded gravel bars on terraces that comprise main canyon floor. Deposited by Bonneville floodwaters (approximately 30,000 years ago).
Root Lake Clay (Qrl)	Laminated lacustrine (lake) clays and silty clays. Occurs as scattered erosion remnants of sediments deposited in Root Lake.
McKinney Basalt	Lava flows of porphyritic plagioclase-olivine basalt.
Pillow Lava (Qmk-p)	Porous, brecciated (broken), open-textured, subaqueous (underwater) deposit of fine sand - to boulder-size pillows (balls and elliposids of glassy lava) and fragments. Formed by rapid cooling of molten lava accompanied by simultaneous steam-shattering. Some pillows are intact, but most are shattered. Includes some breccia and alluvial black sands.
Subaerial Basalt (Qmk-s)	Solidified lava flows that cooled on land surface above water level. May have columnar jointing.

Older Alluvium (not shown on map)	All unconsolidated deposits (talus, landslide debris, colluvium, alluvium, etc.), often highly weathered, mantling the slopes and floor of the ancestral Snake River Canyon, that were inundated by Root Lake and subsequently buried by McKinney Pillow Lava. Highly variable, discontinuous lithologies include: unsorted debris of highly altered basalt and chunks of clay, silt, and sand sediment in a matrix of clay and silt; compact sand and fine gravel with small clay balls in a clay matrix; and loosely consolidated gravel, cobbles, and boulders with minor amounts of sand and clay. Gradational contact with overlying McKinney Pillow Lava. Some of the debris apparently deposited by viscous flow.
Madson Basalt (Qma)	A series of lava flows of columnar olivine basalt from a vent east of Bliss.
Glenns Ferry Formation (QTg)	Poorly consolidated, thinly bedded silt, clay, carbonaceous shale, and some sand and basaltic lava.
Upper Banbury Basalt (Tbu)	A series of olivine basalt flows. Basalt commonly altered by development of clay and other secondary minerals. Flow boundaries characterized by weathered vesicular basalt. Lower portions of flows characterized by hard, massive, nonvesicular, gray basalt with well-developed columnar jointing. Outcrops usually highly weathered, friable (easily crumbled) brown basalt, often with residual spheroids of less decomposed basalt.
Middle Banbury Sediments (not shown on map):	
Bed 1	Highly consolidated dark-green clay with localized tan silt beds.

Bed 2	Tan silt and sand with occassional thin, compact, dark-green, clay layers.
Bed 3	Hard, brittle, highly consolidated, dark-green, silty clay.
Bed 4	Tan silty sand, becoming coarser with depth, with sand and sandstone conglomerate layers near the base.
Bed 5	Compact, dark-green, silty clay.
Banbury Tuff	Hard, dark-gray, fine-grained welded tuff (compacted fine-size volcanic fragments welded together by heat).
Lower Banbury Basalt (not shown on map)	Hard, dark-gray vesicular basalt. Vesicles commonly filled with secondary minerals. Appears unweathered, but may have undergone some degree of hydrothermal groundwater alteration.

1/ Idaho Power Company, 1981b, Application, Exhibit W; Malde, 1971 and 1981; Malde and Powers, 1972; Stearns, 1954.

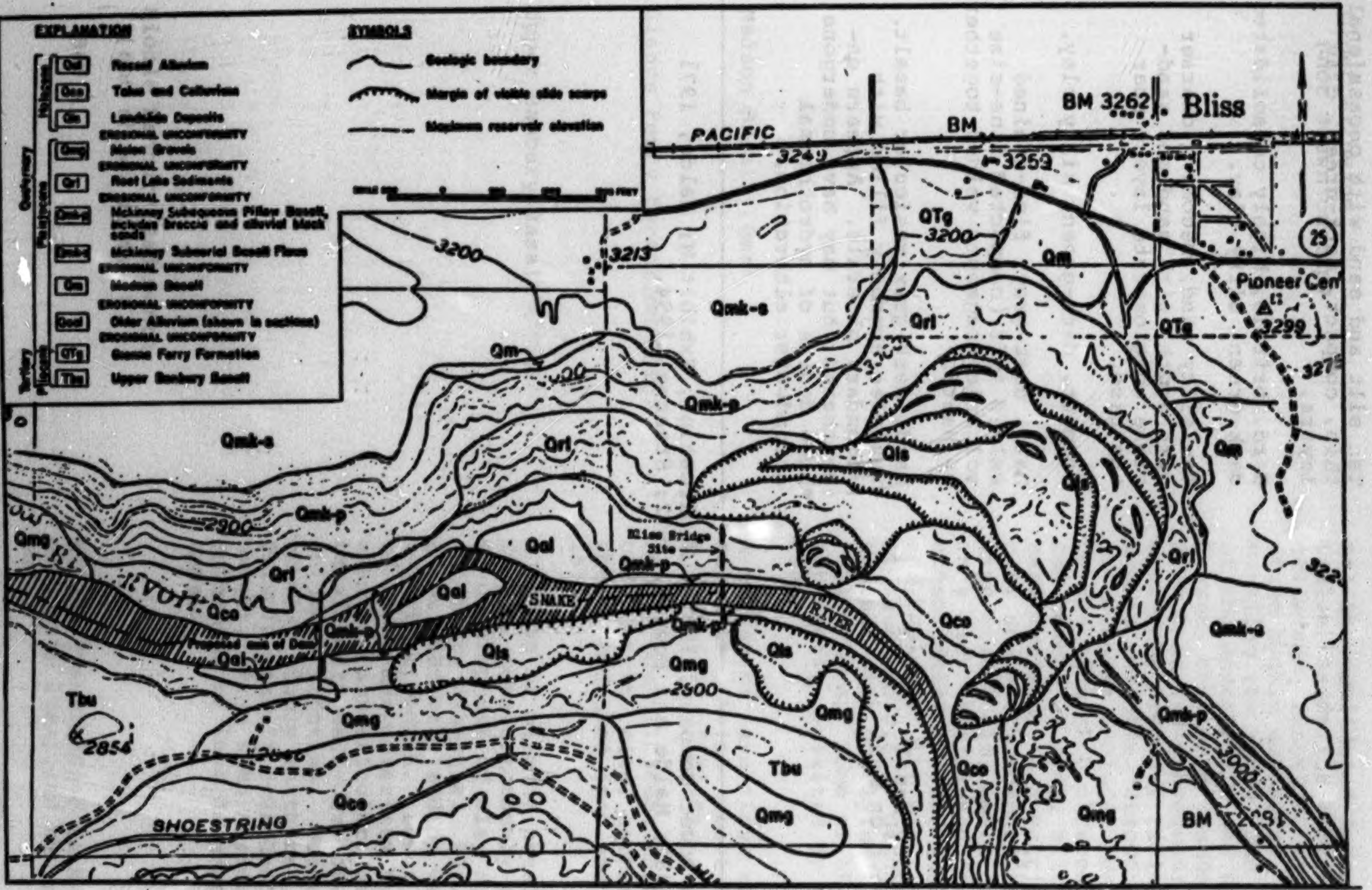
EXPLANATION
Quaternary
Holocene
Qal Recent Alluvium
Qco Talus and Colluvium
Qls Landslide Deposits
EROSIONAL UNCONFORMITY
Pleistocene
Qmg Melon Gravels
EROSIONAL UNCONFORMITY
Qrl Root Lake Sediments
EROSIONAL UNCONFORMITY
Qmk-p McKinney Subaqueous Pillow Basalt, includes breccia and alluvial black sands
Qmk-s McKinney Subaerial Basalt Flows
EROSIONAL UNCONFORMITY
Qm Madson Basalt
EROSIONAL UNCONFORMITY
Qoal Older Alluvium (shown in sections)
EROSIONAL UNCONFORMITY
Tertiary
Pliocene
QTg Glenns Ferry Formation
Tbu Upper Banbury Basalt
SYMBOLS
Geologic boundary
Margin of visible slide scarps
Maximum reservoir elevation
PACIFIC
BM
BM 3262
Bliss
3249
3253
3213
3200
25
Pioneer Cem
3299
3275
3222
QTg
Qm
Qmk-s
Qrl
Qmk-p
Qls
Qal
Qco
Qmg
Tbu
2900
2500
3000
2854
Bliss Bridge Site
SNAKE
RIVER
Proposed axis of Dam
SHOESTRING
0

Figure 3-1. Geologic map of lower portion of project area (Source: Staff, modified from International Engineering Company, 1981a).

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The geology at the proposed damsite is shown in cross-section in Figure 3-2. McKinney Pillow Lava (labeled in the figure as McKinney Basalt), shown in the right (north) abutment, occupies part of an ancestral Snake River Canyon that extended below the level of the present channel. The permeable McKinney Pillow Lava channel fill also underlies the right bank of the river both upstream and downstream of the proposed damsite. A series of simplified cross-sectional sketches showing the origin of the pillow lava channel fill is shown in Figure 3-3. A detailed summary of significant events in the Snake River Canyon's history is provided in Appendix B to enable a better understanding of the geological setting of the proposed project. The summary is an abbreviated version of the canyon's history as developed by Malde (1971; 1981).

Unconsolidated materials in the project vicinity, including those shown in Figure 3-1, are windblown dust (loess), river sands and gravels (alluvium), colluvium, talus, and landslide material.

Soils in the proposed project area have not been mapped. In general, they range from silty clay loams to gravelly loams that have formed on the unconsolidated materials that were originally derived largely from basalt. Applicant has consulted the Gooding and Twin Falls County Soil Conservation Service Offices (SCS), and reports that both offices have indicated that no prime or unique agricultural lands are known to occur within the project boundary.

3.1.2.3 Geologic Hazards and Problems

Existing and potential geologic hazards at the proposed A.J. Wiley Project include landsliding (and other forms of soil mass movement), soil erosion, permeable geological formations, weathered materials, and earthquakes.

Landslides have occurred on several of the slopes in the proposed project area, including portions of the proposed reservoir shoreline, usually in areas underlain by Root Lake Clay (Figure 3-1). The largest landslide area is the Bliss landslide, which covers an area of approximately 0.3 square mile on the north slope of the canyon below the town of Bliss. Portions of the toe of the slide area would be inundated by the proposed reservoir. Landslide activity has occurred at the Bliss landslide at least since the time of Root Lake (Malde, 1981). Applicant reports that the slide area consists of Root Lake Clay overlying Older Alluvium, which is subsequently underlain by Glenns Ferry Formation

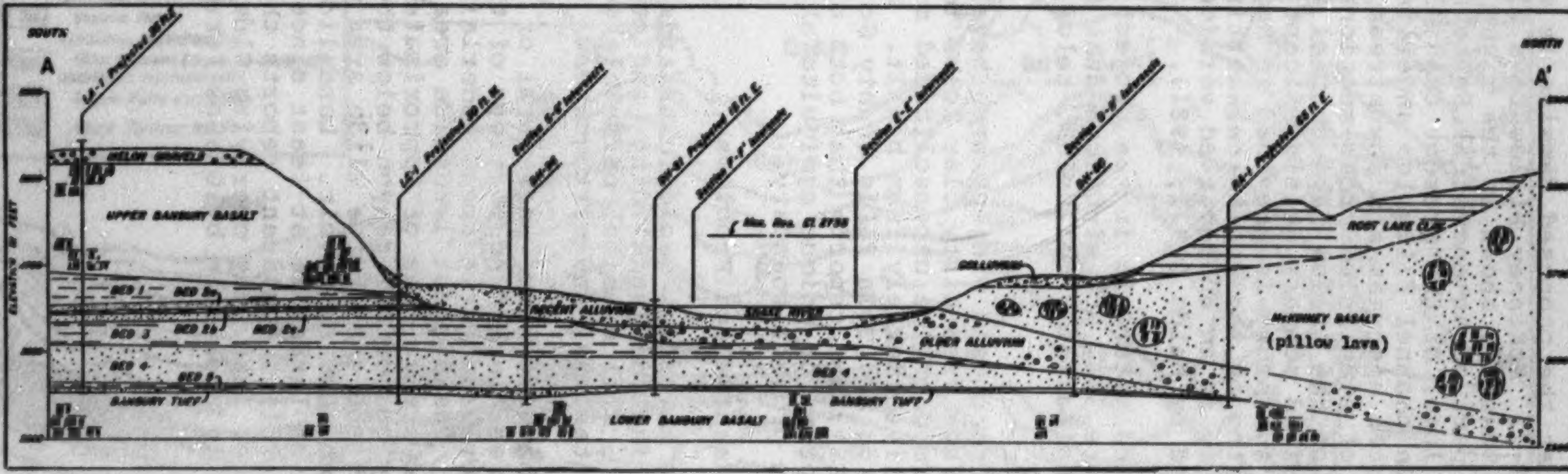
SOUTH
A
NORTH
A'
ELEVATION IN FEET
LS-1 Projected 38 ft. E
LS-1 Projected 30 ft. W
Section G-G' Intersects
DH-36
DH-81 Projected 18 ft. E
Section F-F' Intersects
Max. Res. El. 2798
Section E-E' Intersects
Section D-D' Intersects
DH-80
DH-1 Projected 65 ft. E
MELON GRAVELS
UPPER BANBURY BASALT
BED 1
BED 2a
BED 2b
BED 2c
BED 3
BED 4
BED 5
BANBURY TUFF
LOWER BANBURY BASALT
RECENT ALLUVIUM
SNAKE RIVER
OLDER ALLUVIUM
COLLUVIUM
ROST LAKE CLAY
McKINNEY BASALT
(pillow lava)

Figure 3-2. Cross-section of geology of proposed damsite (Source: Idaho Power Company, 1981b, Application, Exhibit L).

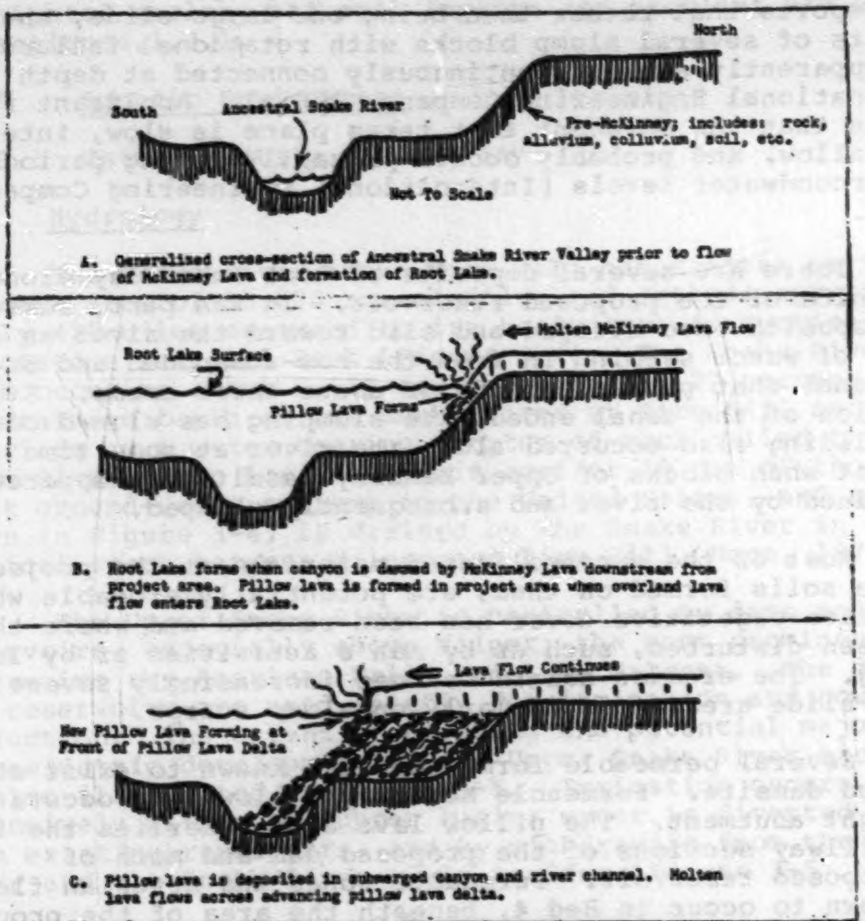
North
South
Ancestral Snake River
Pre-McKinney; includes: rock, alluvium, colluvium, soil, etc.
Not To Scale
A. Generalized cross-section of Ancestral Snake River Valley prior to flow of McKinney Lava and formation of Root Lake.
Molten McKinney Lava Flow
Root Lake Surface
Pillow Lava Forms
B. Root Lake forms when canyon is dammed by McKinney Lava downstream from project area. Pillow lava is formed in project area when overland lava flow enters Root Lake.
Lava Flow Continues
New Pillow Lava Forming at Front of Pillow Lava Delta
C. Pillow lava is deposited in submerged canyon and river channel. Molten lava flows across advancing pillow lava delta.
Lake Deposits
D. Pillow lava has filled ancient river channel, lava flow has ceased, lava has cooled and solidified. Root Lake remains, clay and silt are deposited in lake.
Remnant Root Lake Clay Deposit
Present Channel Being Carved
E. Following overflow of lake, lake sediments were eroded as downcutting by river into lake's bottom accompanied the carving of a new channel/canyon along path of overflow. Some lake sediments remain as remnant deposits. Present channel, in general area of proposed dam site, is at approximate south edge of ancestral channel (see also Figure 3-2).

Figure 3-3. Origin of pillow lava channel-fill in the area of proposed damsite (Source: FERC staff).

sediments (International Engineering Company, 1981a). Applicant also reports that rather than being one large slide, the area consists of several slump blocks with rotational failure zones that apparently are not continuously connected at depth (International Engineering Company, 1981a). Applicant further reports that the movement that takes place is slow, intermittent, and shallow, and probably occurs primarily during periods of high groundwater levels (International Engineering Company, 1981b).

There are several deposits of Root Lake Clay along the south side of the proposed reservoir. In the past, some of the clay deposits have slumped and slid toward the river as a result of water seeping in from the now-abandoned and dry King Hill Canal that passes through or above those areas. Since the operation of the canal ended, the slumping has slowed considerably. Some sliding also occurred along the river at some time in the past when blocks of Upper Banbury Basalt were apparently undermined by the river and subsequently slumped.

Most of the unconsolidated materials at the project, and the soils formed on them, are potentially erodable when protective vegetative cover has been removed and where they have been disturbed, such as by man's activities or by landsliding. The erosion hazard becomes increasingly severe on active-slide areas, particularly on slump scarps.

Several permeable formations are known to exist at the proposed damsite. Permeable McKinney Pillow Lava occurs in the right abutment. The pillow lava also underlies the intake and spillway sections of the proposed dam and much of the proposed reservoir. Permeable zones and artesian flows are known to occur in Bed 4, beneath the area of the proposed earthfill embankment, spillway, and powerhouse. Permeable materials--sand, gravel, and boulders--are also anticipated in the Older Alluvium, which also consists largely of highly weathered materials. Some of the Upper Banbury Basalt, which comprises the left abutment of the proposed damsite, may be prone to rapid weathering and deterioration during prolonged exposure because of hydrothermal groundwater alteration that occurred under former geologic conditions. Permeable Melon Gravel and more recent alluvial deposits that exist at the damsite would be removed during dam construction.

No active or inactive geologic faults are known to occur within the proposed project area, although ground shaking may occur from earthquake activity outside the project area. Seismic risk evaluation is most applicable to the design of the proposed project, and is discussed in Section 2.1.9.1.

The landsliding, erosion, reservoir seepage, and other anticipated geology and soil impacts and problems are discussed in Section 4.1.3.1.

3.1.3 Aquatic Environment

3.1.3.1 Water Quantity and Quality

Hydrology

The Snake River above King Hill has a total surface drainage area of 35,800 square miles and extends approximately 425 miles eastward to its headwaters in Wyoming at Yellowstone National Park (Figure 3-4). The Snake River Plain occupies about 9,653 square miles, or 27 percent, of the drainage basin of the Snake River at King Hill and is underlain by a water-bearing stratum of rock called the Snake River Plain Aquifer. This aquifer is one of the great ground-water systems in the United States, and as shown in Figure 3-4, is drained by the Snake River in a critical reach between Milner and King Hill (Nace, 1973.)

The Upper Snake River is controlled by dams and reservoirs, especially above Milner; the most prominent reservoirs are American Falls and Lake Walcott. The dams and reservoirs are used chiefly for irrigation and power production. The extent of existing and potential major hydroelectric development of the Upper Snake River basin is also illustrated in Figure 3-5. Irrigation occurs extensively within the upper basin; water is diverted from existing reservoirs, and by withdrawals from the Snake River and the Snake River Plain Aquifer (Figure 3-5).

The major tributaries between Milner and King Hill are the Malad River, Salmon Falls Creek, Box Canyon Spring, Rock Creek, and Blue Lakes Spring (Figure 3-5).

An analysis by Mundorff et al. (1964) indicated that the total gain of the Snake River from the aquifer between Milner and King Hill was about two-thirds of the discharge measured at the King Hill gage. Travis et al. (1964) indicated that over 80 percent of the groundwater discharged occurs at Thousand Springs (Table 3-2).

As shown in Table 3-2, agricultural return flow from the Twin Falls side tract constitutes the greatest source of surface water inflow to the Snake River between Milner and King Hill.

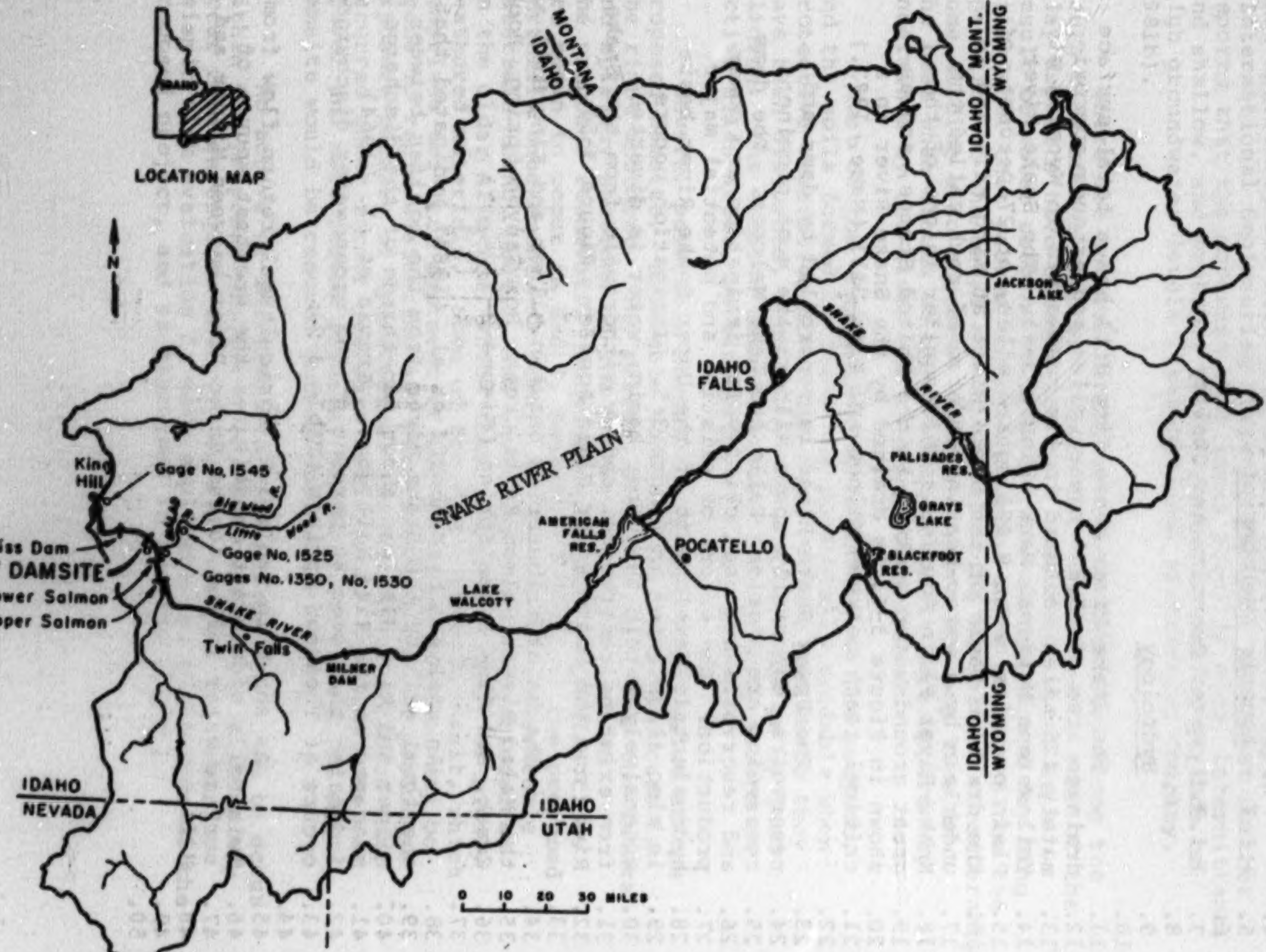
LOCATION MAP
IDAHO
N
MONTANA
IDAHO
IDAHO
MONT.
WYOMING
JACKSON LAKE
SNAKE
RIVER
PALISADES RES.
GRAYS LAKE
BLACKFOOT RES.
IDAHO
WYOMING
IDAHO FALLS
POCATELLO
AMERICAN FALLS RES.
SNAKE RIVER PLAIN
LAKE WALCOTT
MILNER DAM
Twin Falls
SNAKE RIVER
King Hill
Gage No. 1545
Big Wood
Little Wood R.
Malad R.
Gage No. 1525
Gages No. 1350, No. 1530
Bliss Dam
WILEY DAMSITE
Lower Salmon
Upper Salmon
IDAHO
NEVADA
IDAHO
UTAH
0 10 20 30 MILES

Figure 3-4. Upper Snake River Basin (Source: Idaho Power Company, 1981b, Application, Exhibit W).

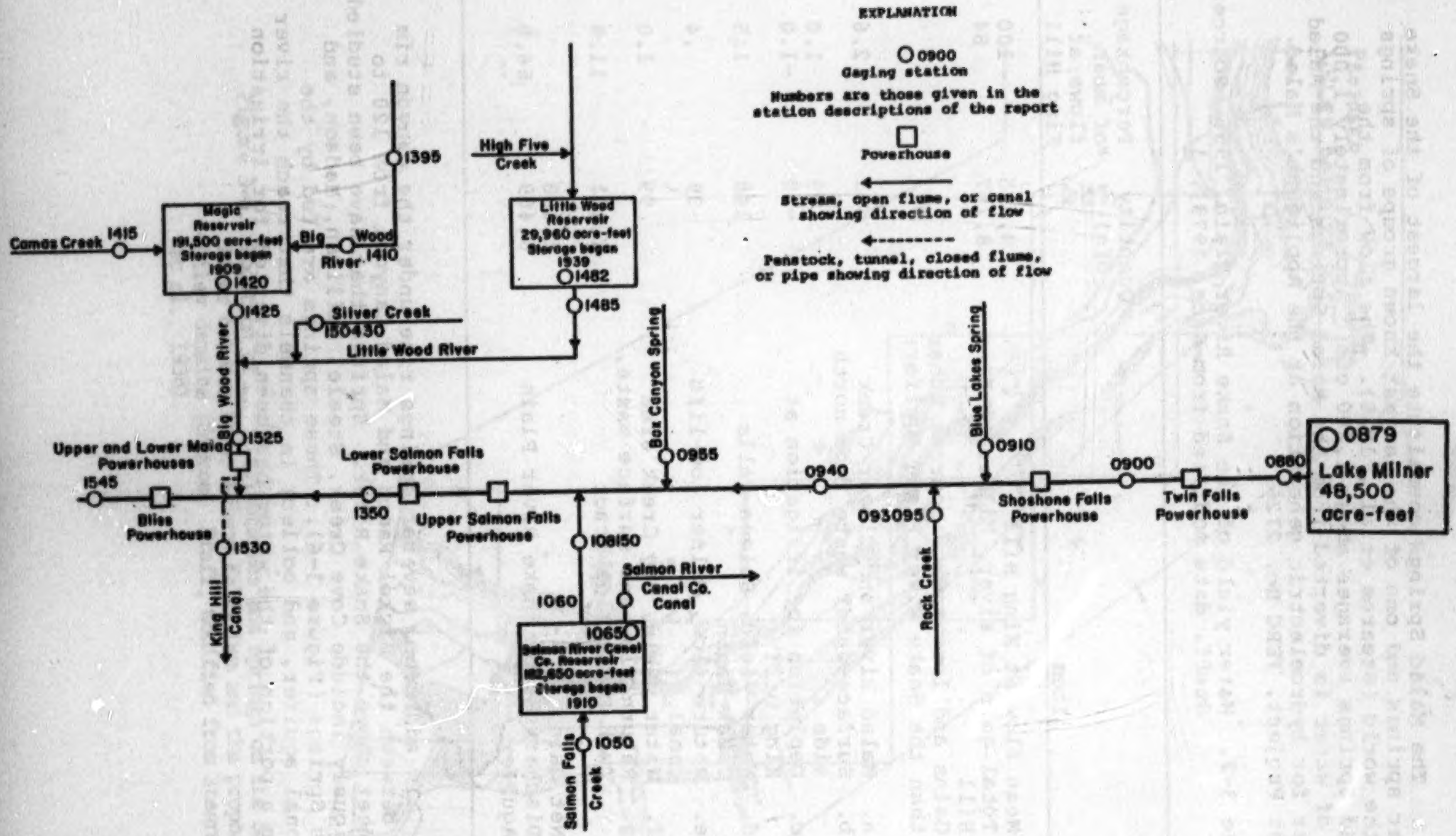
EXPLANATION
0900
Gaging station
Numbers are those given in the station descriptions of the report
Powerhouse
Stream, open flume, or canal showing direction of flow
Penstock, tunnel, closed flume, or pipe showing direction of flow
0879
Lake Milner
48,500
acre-feet
0880
Twin Falls Powerhouse
0900
Shoshone Falls Powerhouse
0910
Blue Lakes Spring
093095
Rock Creek
0940
0955
Box Canyon Spring
High Five Creek
Little Wood Reservoir
29,960 acre-feet
Storage began
1939
1482
1485
Little Wood River
Silver Creek
150430
1395
Wood
Big
River
1410
Camas Creek
1415
Magic Reservoir
191,500 acre-feet
Storage began
1909
1420
1425
Big Wood River
1525
Upper and Lower Malad Powerhouses
1545
Bliss Powerhouse
1530
King Hill Canal
1350
Lower Salmon Falls Powerhouse
Upper Salmon Falls Powerhouse
108150
1060
Salmon River Canal Co. Canal
1065
Salmon River Canal Co. Reservoir
182,650 acre-feet
Storage began
1910
1050
Salmon Falls Creek

Figure 3-5. Gaging stations, powerhouses, reservoirs, and tributaries on the Snake River between Milner and Murphy, Idaho (Source: U.S. Geological Survey, 1979).

The Malad Springs constitute the largest of the Snake River springs and one of the largest known groups of springs in the world (Stearns et al., 1938). The flow from the Malad Springs averages about 1,200 cfs. Approximately 1,000 cfs of water is diverted from the Malad Springs and the Malad River for hydroelectric generation at the Applicant's Malad River Project, FERC No. 2726.

Table 3-2. Water yield of the Snake River Plain, 1955 (Source: Staff, data modified from Nace, 1973). 1/

Item	Quantity (cfs)	Percentage of mean flows at King Hill
1. Mean flow at King Hill	9,675	100
2. Total gain of river, Milner to King Hill	8,157	84
3. Gains and losses from sources other than the Snake River Plain Aquifer:		
a. Malad River and Clover Creek	351	2.6
b. Surface-water waste from north side	99	1.0
c. Depletion for irrigation at King Hill	-99	-1.0
d. Water yield, Salmon Falls Creek Basin	148	1.5
e. Return flow, Milner low-lift canal	39	.4
f. Water yield, Dry Creek area	99	1.0
g. Return flow and surface waste, Twin Falls side tract	1,151	11.9
Net Gain	1,688	
4. Discharge from Snake River Plain Aquifer	6,469	66.9

In addition, several springs rise under the canyon rim rock between the Bickel Ranch and Malad Canyon, from 120 to 150 feet above the Snake River. Springs that have been studied previously include Cove Creek, Steele, Sullivan, Madson, and Bliss Springs (Figure 3-6). These springs are fed by the regional aquifer, and collect in channels that reach the river after a portion of the water has been diverted for irrigation

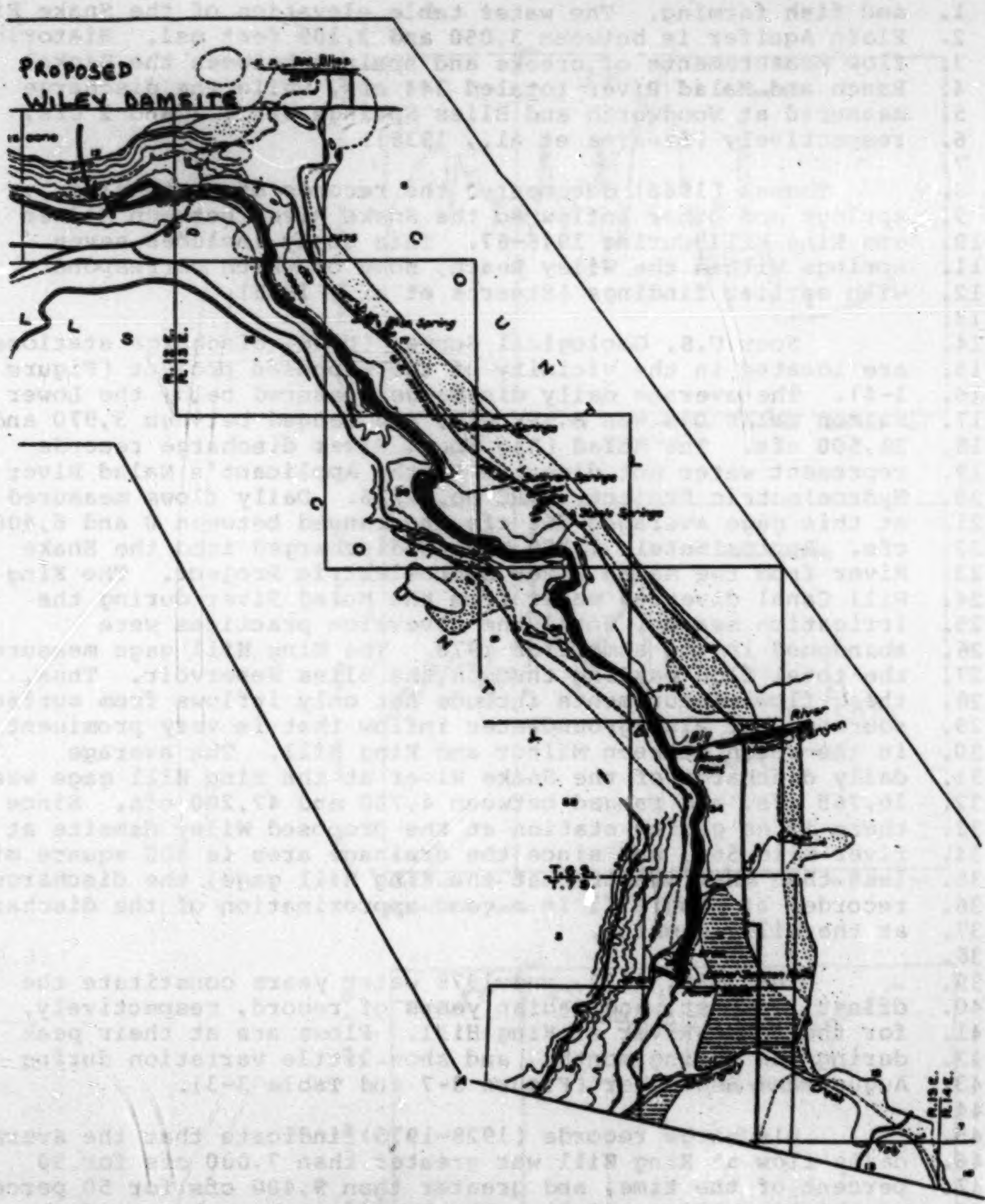
PROPOSED
WILEY DAMSITE
Springs
River
T.8S.
T.7S.

Figure 3-6. Location of major tributaries and springs on the Snake River between Lower Salmon Falls Dam and the proposed Wiley damsite (Source: Staff, modified from Stearns et al., 1938).

and fish farming. The water table elevation of the Snake River Plain Aquifer is between 3,050 and 3,109 feet msl. Historical flow measurements of creeks and springs between the Bickel Ranch and Malad River totaled 344 cfs, while the discharge measured at Woodworth and Bliss Springs was 7.7 and 2 cfs, respectively (Stearns et al., 1938).

Thomas (1968) documented the records of north-side springs and other inflow to the Snake River between Milner and King Hill during 1948-67. This study includes seven springs within the Wiley Reach, some of which correspond with earlier findings (Stearns et al., 1938).

Four U.S. Geological Survey (USGS) discharge stations are located in the vicinity of the proposed project (Figure 3-4). The average daily discharge measured below the Lower Salmon Falls Dam was 8,996 cfs, and ranged between 3,970 and 28,500 cfs. The Malad (Big Wood) River discharge records represent water not diverted by the Applicant's Malad River Hydroelectric Project, FERC No. 2726. Daily flows measured at this gage averaged 268 cfs and ranged between 0 and 6,400 cfs. Approximately 1,200 cfs is discharged into the Snake River from the Malad River Hydroelectric Project. The King Hill Canal diverted water from the Malad River during the irrigation season, until the diversion practices were abandoned in the summer of 1978. The King Hill gage measures the total flow passing through the Bliss Reservoir. Thus, these flow measurements include not only inflows from surface sources, but also groundwater inflow that is very prominent in the reach between Milner and King Hill. The average daily discharge of the Snake River at the King Hill gage was 10,765 cfs, and ranged between 4,760 and 47,200 cfs. Since there is no gaging station at the proposed Wiley damsite at river mile 565, and since the drainage area is 800 square miles less than that measured at the King Hill gage, the discharge recorded at King Hill is a good approximation of the discharge at the Wiley damsite.

The 1935, 1972, and 1979 water years constitute the driest, wettest, and median years of record, respectively, for the Snake River at King Hill. Flows are at their peak during the spring months, and show little variation during August and September (Figure 3-7 and Table 3-3).

Discharge records (1928-1975) indicate that the average daily flow at King Hill was greater than 7,000 cfs for 90 percent of the time, and greater than 9,400 cfs for 50 percent of the time (Figure 3-8). The Applicant has also used the discharge records from the USGS stream gaging stations in Figure 3-8, and has expressed the frequency of occurrence for

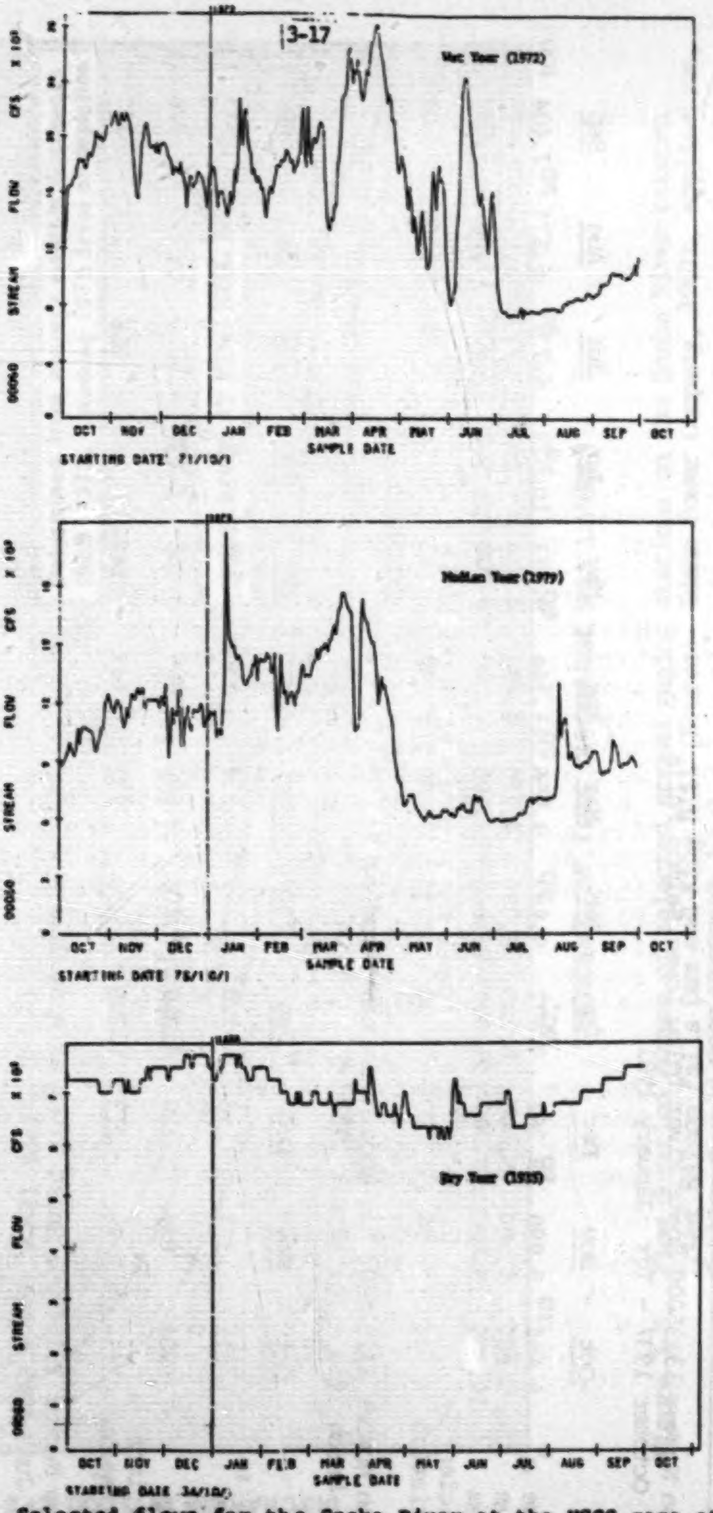

Figure 3-7. Selected flows for the Snake River at the USGS gage at King Hill, Idaho (Source: U.S. Geological Survey, 1979).

Table 3-3. Descriptive statistics of flow data for selected stream gaging stations on the Snake River, Idaho. 1/ 2/

Station Number 13135000 Snake River below Lower Salmon Falls
From: October 1937 - To: January 1981

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average	8,604	8,890	9,262	9,602	9,882	9,956	11,144	9,873	10,023	6,737	6,674	7,404
Minimum	5,860	5,500	5,300	5,200	5,080	4,710	4,480	4,970	5,000	3,970	5,320	5,670
Maximum	19,800	19,800	18,000	21,000	20,800	23,500	28,500	26,200	28,500	22,900	11,000	9,550
Coefficient of variation	24	26	28	30	34	40	49	52	53	35	08	08

Station Number 13152500: Big Wood River near Gooding
From: March 1916 - to: April 1981

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average	111	125	110	128	197	334	550	509	407	92	69	124
Minimum	0	0	0	0	0	1	0	0	0	0	0	0
Maximum	901	614	5,220	3,250	5,100	3,680	6,400	5,160	2,620	1,710	770	836
Coefficient of variation	136	78	213	205	190	131	147	142	137	216	106	117

Station Number 13154500: Snake River at King Hill
From: June 1909 - to: April 1981

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average	10,391	10,980	10,958	11,095	11,371	11,638	12,609	12,406	13,245	8,499	7,659	8,658
Minimum	6,400	6,750	6,700	6,800	6,740	6,080	6,180	5,840	5,660	4,760	4,760	5,090
Maximum	21,700	26,300	27,100	26,300	22,400	26,400	32,300	36,600	47,200	37,500	20,900	20,100
Coefficient of variation	24	23	23	24	27	33	43	52	61	49	15	19

1/ USGS-Water Storage Retrieval System.
2/ All flows expressed as average daily values in cubic feet per second

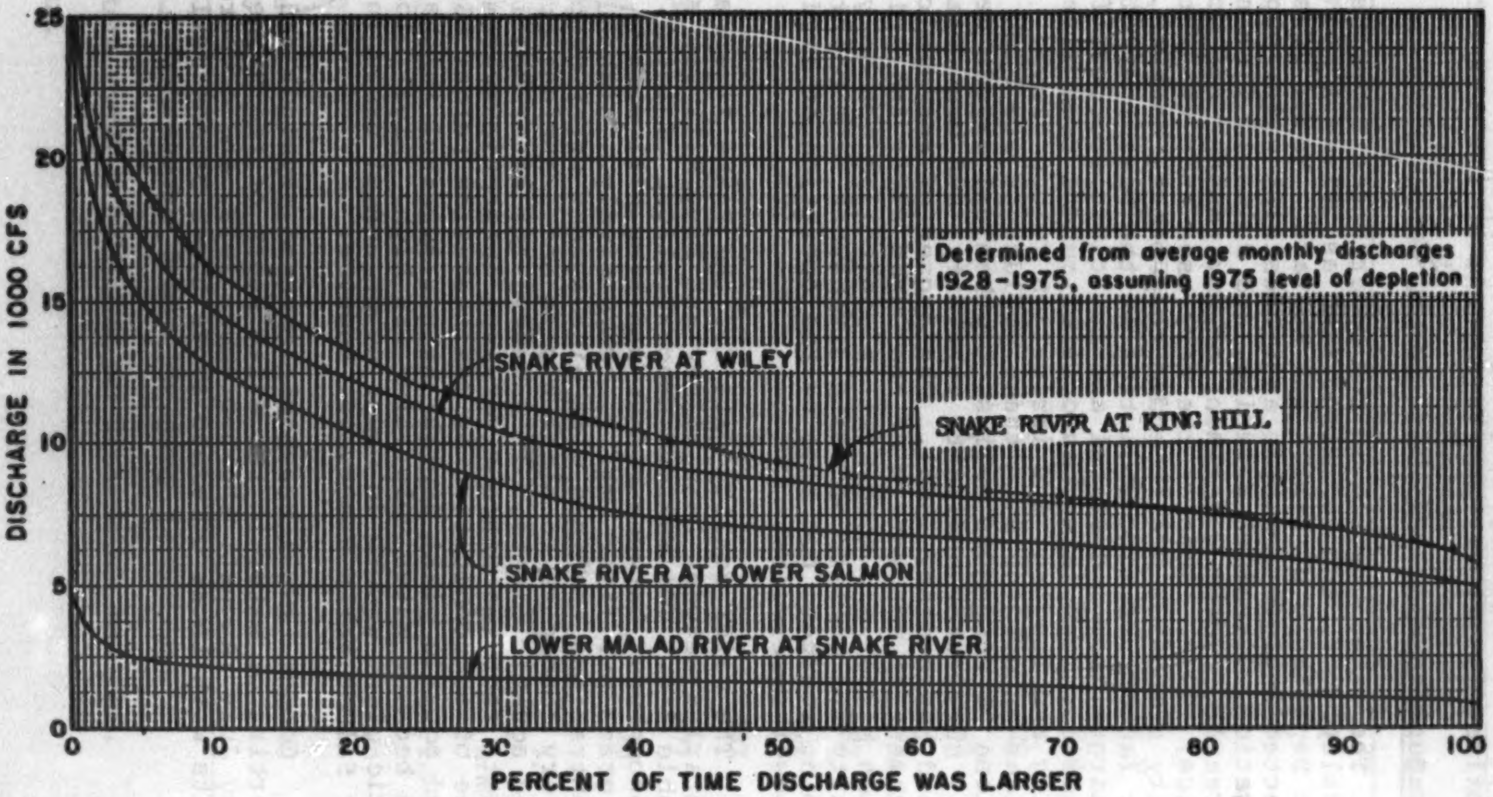

Figure 3-8. Flow duration curves of selected stream gaging stations on the Snake River between Lower Salmon Falls Dam and King Hill (Source: Idaho Power Company, 1981b, Application, Exhibit I, and USGS WATSTORE data).

all sites at the 1975 level of depletion (Idaho Power Company, 1981b, Application, Exhibit I). The lowest discharges occur during July, August, and September. A monthly discharge of 7,000 cfs during July, August, and September is exceeded approximately 77, 94, and 96 percent of the time, respectively.

Water Quality

The water quality in the Upper Snake River Basin is generally good, and is categorized as "Class A" by the Idaho Department of Health and Welfare. Water uses to be protected include domestic and industrial water supply, irrigation, livestock watering, and salmonid fish spawning and rearing (Idaho Department of Environment and Community Service, 1973). Some of the very uses that the water quality standards are intended to protect, however, are the major factors causing pollution in the basin; namely, discharges from industrial and municipal sources, fish hatcheries, fish farms, associated runoff from livestock grazing and feeding, and irrigation return flows. The problems associated with these pollutants are high concentrations of suspended solids, biochemical oxygen demand (BOD), nutrients, sediment, turbidity, and bacteria (Bureau of Land Management, 1980). The degree of eutrophication or enrichment of the waters of the Snake River and tributaries between Milner and King Hill is controlled not only by the quantity and quality of waste discharges from point and nonpoint sources, but also by the operation of irrigation and power reservoirs.

The water quality data for the Snake River and its tributaries between Lake Milner and King Hill are summarized in Table 3-4. The maximum concentrations of total nitrogen and phosphorus between Milner and King Hill were 7.7 and 2.7 milligrams per liter (mg/l), respectively. High nutrient concentrations combined with high summer water temperatures are very conducive to algal blooms and luxuriant growth of rooted aquatic plants. In summary, the water quality data indicate that the Snake River is a eutrophic system; the degree of eutrophication or manifestation (algal blooms, rooted aquatic plant growth) is not apparent in the Wiley Reach because water velocities are high. Algal blooms and aquatic plant growth do occur on an annual basis in the Lower Salmon Falls Reservoir, however.

Connor (1980) measured selected physical and chemical properties of water in the Wiley Reach of the Snake River during July, August, and September 1979, and compared the results with those obtained above Lower Salmon Falls Dam.

Table 3-4. Summary of water quality data collected between Lake Milner and King Hill, Idaho. 1/

Parameters 2/	Number of samples	Average	Standard deviation	Minimum	Maximum
Temperature (°F)	749	52.2	.37	32	84
Turbidity (JTU)	134	7.2	7.8	0	70
Specific conductance (umhos/cm)	1,218	487	146	101	966
Dissolved oxygen	223	10.3	1.6	5.1	15.1
pH (field) 3/	864	8.2	.35	6.3	9.9
Bicarbonate	831	208	34	7.0	320
Calcium	663	48	10	11	88
Magnesium	663	19	3.9	5.7	34
Sodium	781	31	11.8	3	82
Total hardness	788	198	35.6	0	366
Sulfate	578	56	30	9.1	187
Dissolved solids	724	319	67	122	677
Biochemical oxygen demand (5 days)	47	4.2	2.2	0.6	10
Total nitrogen -N	233	1.3	0.97	0.04	7.7
Ammonia -N	128	0.10	0.12	0	0.62
Total phosphorus -P	374	0.10	0.15	0	2.7
Fecal coliform (colonies/100 ml)	109	282	648	1	3,900
Fecal strepotocci (colonies/100 ml)	74	258	443	3	2,000

1/ Source: U.S. Environmental Protection Agency STORET data.

2/ All parameters stated in milligrams per liter unless specified.

3/ Median value.

The water temperature and dissolved oxygen (DO) data indicate that the Wiley Reach is influenced to a great degree by flow releases from the Lower Salmon Falls Reservoir and that reservoir waters are well mixed. Usually reservoirs become thermally stratified during the summer months; however, vertical temperature measurements at different depths in the Lower Salmon Falls Reservoir showed no stratification (Connor, 1980). This may be due to the operation of the reservoir as a run-of-the-river power development and the relatively shallow depth of 39.6 feet near the face of the dam.

The levels of ammonia, nitrite, nitrate, and orthophosphate are indicators of eutrophication in natural waters. Ammonia occurs in all natural waters, mainly in ionized form (NH_4) and the toxic unionized form NH_3; the concentration of NH_3 is dependent upon pH and temperature. Average ammonia concentrations at the four sites ranged between 0.40 and 0.45 mg/l, and increased slightly in a downstream direction. After August 9, 1979, ammonia concentrations were greater than 0.52 mg/l at the four river sites; this seemed to be due to the discharges from fish farms or decomposition products from vegetation previously inundated (Connor, 1980). The high ammonia concentration, warm temperatures, and high pH values caused the concentration of toxic unionized ammonia (NH_3) to exceed 0.02 mg/l, the lower limit of toxicity for fish and aquatic life (Figure 3-9). No measurements of ammonia have been made in any of the springs entering the Wiley Reach, but Connor (1980) strongly suspects that the areas of spring inflow for the Snake River may become toxic zones during the summer months. These areas are localized, and the toxic zone would dissipate when toxic NH_3 was diluted with river water. This may also explain why water quality measurements downstream do not reflect these high ammonia concentrations.

Average nitrate (NO_3-N) concentrations at the river sites ranged between 0.73 and 0.81 mg/l; the impoundment site has an average concentration of 0.77 mg/l. All of these concentrations exceed the threshold concentration of 0.3 mg/l NO_3-N known to promote algal blooms.

Orthophosphate (PO_4-P) concentrations measured in the impoundment site averaged 0.09 mg/l, and increased from 0.06 to 0.09 mg/l with increasing depth (Connor, 1980). Average PO_4-P concentrations at the river stations were 0.08 mg/l, which is indicative of the effect of the Lower Salmon Falls Reservoir on downstream water quality. All samples analyzed for PO_4-P were well above the maximum criterion of 0.025 mg/l set to prevent algal blooms (Environmental Protection Agency, 1976).

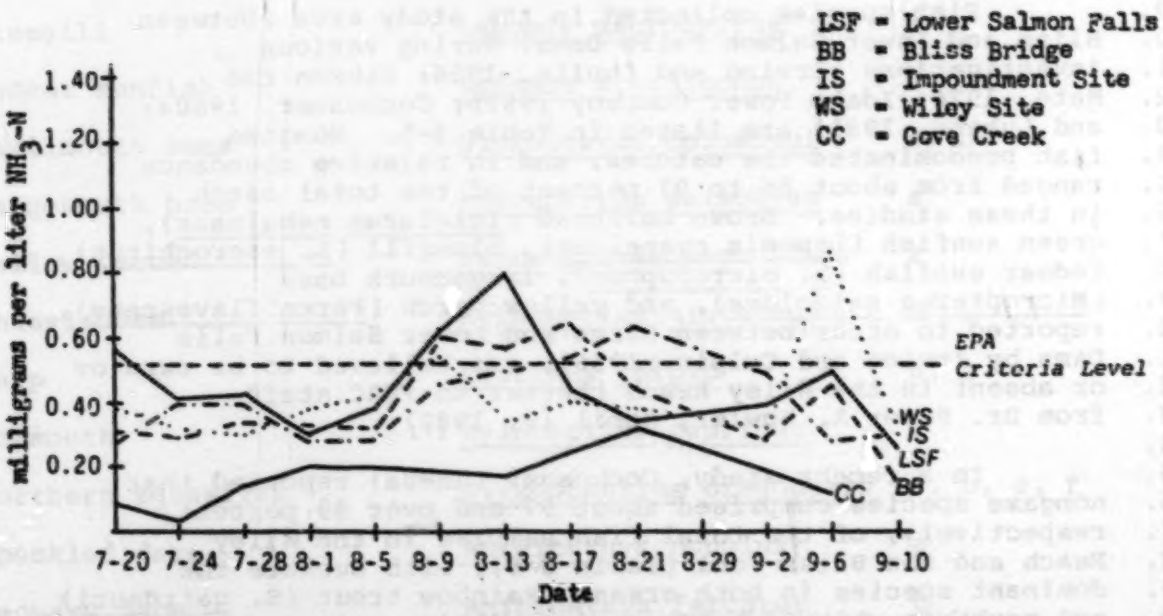

Figure 3-9. Average daily ammonia/nitrogen concentration at sampling station for sampling period of July 20, 1977, to Sept. 10, 1979 (Source: Connor, 1980).

3.1.3.2 Fishery Resources

The Snake River as far upstream as Shoshone Falls historically supported runs of salmon (*Oncorhynchus* sp.), steelhead, (*Salmo gairdneri gairdneri*), sturgeon (*Acipenser transmontanus*), Pacific lamprey (*Entosphenus tridentata*), and cutthroat trout (*S. clarki*) [Evermann, 1896; Bowler, 1982]. With the construction of hydroelectric dams in the Middle Snake River, these anadromous species were blocked from gaining access to the upper Snake River. Populations of sturgeon occur in the remaining free-flowing sections of the Snake River below Shoshone Falls. The Snake River between Bliss Dam and Lower Salmon Falls Dam consists of a 7.9-mile-long, free-flowing section (Wiley Reach) and the 5.0-mile-long reservoir behind Bliss Dam (Bliss Pool), with the Wiley damsite roughly at the transition between the two.

Fish species collected in the study area (between Bliss and Lower Salmon Falls Dams) during various investigations (Irving and Cuplin, 1956; Gibson and Mate, 1976; Idaho Power Company 1981b; Cochnauer, 1980a; and Lukens, 1981) are listed in Table 3-5. Nongame fish predominated the catches, and in relative abundance ranged from about 86 to 97 percent of the total catch in these studies. Brown bullhead (*Ictalurus nebulosus*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), redear sunfish (*L. microlophus*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*), reported to occur between Bliss and Lower Salmon Falls Dams by Irving and Culpin (1956), are believed to be rare or or absent in the Wiley Reach (Letter to FERC staff, from Dr. Peter A. Bowler, April 19, 1982).

In a recent study, Cochnauer (1980a) reported that nongame species comprised about 97 and over 99 percent, respectively, of the total fish sampled in the Wiley Reach and the Bliss Pool (Table 3-6), with suckers the dominant species in both areas. Rainbow trout (S. *gairdneri*) and mountain whitefish (*Prosopium williamsoni*) were the only game species captured by Cochnauer. Rainbow trout were more abundant in the Wiley Reach than in the Bliss Pool, and were only found in spring areas and riffle sites. Mountain whitefish were observed exclusively within 0.6 mile of Lower Salmon Falls Dam in the Wiley Reach. Cochnauer's capture of 11 species suggests that the fish population in the Wiley Reach is more diverse than that of the Bliss Pool, where only 6 species were captured.

Table 3-5. Common and scientific names of game and nongame fish collected in the Snake River between Bliss and Lower Salmon Falls Dams.

		References
White sturgeon	Acipenser transmontanus	a, d, e
Mountain whitefish	Prosopium williamsoni	a, b, c, f
Rainbow trout	Salmo gairdneri	a, b, c, f
Brown bullhead	Ictalurus nebulosus	a
Channel catfish	Ictalurus punctatus	a
Green sunfish	Lepomis cyanellus	a
Bluegill	Lepomis macrochirus	a
Redear sunfish	Lepomis microlophus	a
Smallmouth bass	Micropterus dolomieui	a, b
Largemouth bass	Micropterus salmoides	a
Yellow perch	Perca flavescens	a
Chiselmouth	Acrocheilus alutaceus	a
Carp	Cyprinus carpio	a, c
Peamouth	Mylocheilus caurinus	c
Northern squawfish	Ptychocheilus oregonesis	a, b, c, f
Speckled dace	Rhinichthys osculus	a
Leopard dace	Rhinichthys falcatus	c
Redside shiner	Richardsonius balteatus	a, c
Bridgelip sucker	Catostomus columbianus	a, c, f
Largescale sucker	Catostomus macrocheilus	a, c, f
Mottled sculpin	Cottus bairdi	c
Shoshone sculpin	Cottus greenei	c

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a. Irving and Culpin, 1956.
b. Gibson and Mate, 1976.
c. Cochnauer, 1980a.
d. Cochnauer, 1980b.
e. Lukens, 1981.
f. Idaho Power Company, 1981b.

Table 3-6. Relative abundance of total fish sampled in the Wiley Reach and in the Bliss Pool of the Snake River. 1/

Species	Total fish observed	
	No.	Percent
Wiley Reach		
Largescale sucker Bridgelip sucker	1,717	72.9
Northern squawfish	180	7.6
Peamouth chub	153	6.5
Carp	106	4.5
Redside shiner	99	4.2
Mountain whitefish	35	1.5
Rainbow trout	33	1.4
Leopard dace	21	0.9
Sculpin, mottled	6	0.3
Sculpin, Shoshone	5	0.2
Bliss Pool		
Largescale sucker	206	73.0
Carp	35	12.4
Northern squawfish	27	9.6
Redside shiner	8	2.8
Peamouth chub	5	1.8
Rainbow trout	1	0.4

1/ Cochnauer, 1980a.

Irving and Cuplin (1956) described a more diverse game fish population in the Bliss Pool than Cochnauer. In addition to rainbow trout and mountain whitefish, Irving and Cuplin (1956) found brown bullhead, bluegill, yellow perch, channel catfish, green sunfish, and largemouth bass. Rainbow trout and mountain whitefish made up the majority of the catch while other species appeared in low numbers.

Rainbow trout is the major game fish species in the project area, and supports sport fishing in the mainstem Snake and Malad Rivers. The majority of rainbow trout are caught near the mouths of the Malad River and the spring-fed streams that enter the Snake. In addition, a unique fishery occurs near the mainstem rapids for relatively large (12 to 20 inches) rainbow trout. Channel catfish and smallmouth bass are also taken in the Wiley Reach by anglers.

Natural reproduction of rainbow trout in the project area probably occurs primarily in the mainstem Snake, and to a lesser extent in the lower Malad River and in the several spring-fed streams along the north bank. Numerous trout farms along the Snake also contribute to the mainstem trout stock through inadvertent releases. The relative contribution of natural reproduction versus trout farm releases is unknown.

Isolated populations of white sturgeon, recognized by the State of Idaho as a species of special concern, are known to occur in free-flowing sections of the Snake River (Idaho Department of Fish and Game, 1978). In studies conducted in 1980 and 1981 in the Wiley Reach, seven white sturgeon were captured, none of which were less than 29 inches in length (Lukens, 1981). All seven were captured immediately downstream of Lower Salmon Falls Dam. By contrast, 313 white sturgeon were captured in the free-flowing sections downstream of the Wiley Reach between C.J. Strike Reservoir and Bliss Dam in 1979 and 1980 (Cochnauer, 1980b). Of these, 168 or about 54 percent were less than 29 inches in length. The absence of smaller fish in the Wiley Reach suggests that little or no reproduction or recruitment has occurred there in recent years. Furthermore, the relative numbers of fish captured in the two study areas (Lukens, 1981; Cochnauer, 1980b) indicate that the white sturgeon population in the Wiley Reach is severely depressed. Overfishing and the long maturation time (11 to 34 years) are believed by Lukens (1981) to be responsible for the low aboundance in the Wiley Reach. Low abundance, in turn, is believed to be a reason for the lack of successful spawning in this reach (T. Cochnauer, Idaho Department of Fish and Game, June 28, 1982, to FERC staff, personal communication.)

The occurence of the Shoshone sculpen is discussed in Section 3.1.5

3.1.3.3 Invertebrate Communities

The invertebrate communities in the vicinity of the project area on the Snake River have been investigated by Irving and Cuplin (1956), Idaho Power Company (1981b), and Lee et al. (1980). Benthic fauna in slow-to-moderate-flowing areas of the Wiley Reach is characterized by gastropods, an amphipod, and dipteran insect larvae; in fast-flowing areas of the Wiley Reach, caddisflies, mayflies, and lepidopteran insects predominate (Lee et al., 1980). These results are consistent with those of Irving and Cuplin (1956), who reported that aquatic insects (primarily caddisflies) comprised about one-third of the organisms collected although Pulmonata (various gastropod families) was the dominant taxon collected in the Wiley Reach.

Densities and diversities of benthic invertebrates were greater in the Wiley Reach upstream of the proposed damsite than in the transition zone between the Wiley Reach and Bliss Pool (Idaho Power Company, 1981b). Maximum densities were 576 organisms per sample, representing 19 taxonomic families, in the Wiley Reach, and 82 organisms per sample, representing 13 taxonomic families, in the transition zone.

Tubificid worms dominated the bottom fauna of Bliss Pool (Irving and Cuplin, 1956; Idaho Power Company, 1981b). In the Lower Salmon Falls Reservoir, upstream of the Wiley Reach, chironomids and the tubificids were dominant (Lee et al., 1980).

Several mollusks which are unique to southern Idaho and occur in the project area include the Snake River Physa snail, Bliss Rapids snail, and the Giant Columbia River limpet, *Fisherola nuttalli*. The Snake River Physa snail and the Bliss Rapids snail are discussed in Section 3.1.5.

The Giant Columbia River limpet has been found in the Snake River in Idaho in only two areas: in the white-water segment of the Snake River below Lower Salmon Falls Dam to Bancroft Springs; and near Rupert, Minidoka County. The latter occurence dates to 1913 and has not been confirmed in recent years. The Giant Columbia River limpet has been found characteristically on boulders in rapids, as have the Snake River Physa and Bliss Rapids snails. Locally, all three species can be found together. The occurrences in southwestern Idaho are hundreds of miles from the other surviving colonies in the Columbia River drainage (Letter to FERC from Dr. Dwight W. Taylor, April 23, 1982).

3.1.3.4 Aquatic Plants

Aquatic plants in the Wiley Reach include benthic attached algae, phytoplankton from Lower Salmon Falls reservoir, and vascular plants. Benthic algae, especially diatoms, dominate the project reach of the river because of the higher flow velocities. The major genera of diatoms observed in the project reach include *Tabellarea* spp., *Nitzchia* spp., *Diatoma* spp., *Fragilaria* spp., and *Navicula* spp. (Connor, 1980). Green and blue-green algae include *Cladophora* spp., *Ulothrix* spp., and *Microspora* spp. Connor (1980) indicated that these algae were predominantly filamentous forms attached to larger rocks in the Wiley Reach.

The algae found in the Lower Salmon Falls Reservoir were chiefly green algae; *Microspora* spp. was the dominant form of green algae in the reservoir. Plankton samples from the Lower

Salmon Falls Reservoir also contained a greater concentration of blue-green algae than the Wiley Reach, while diatoms were found in relatively low concentrations. The qualitative differences in the phytoplankton in the reservoir and the Wiley Reach are due chiefly to water velocity and hydraulic retention time. The faster-flowing water of the Wiley Reach has a detrimental effect on phytoplankton that are discharged from the Lower Salmon Falls Reservoir.

Submerged plants occupy only 2.1 percent of the Wiley Reach because of the narrow littoral zone. Submerged plants in the Lower Salmon Falls Reservoir occupy 23.4 percent of the total surface of the reservoir (Connor, 1980).

3.1.4 Terrestrial Environment

The proposed A.J. Wiley Project is within the Snake River Plain, which is characterized by a semiarid climate and vegetation dominated by big sagebrush (*Artemesia tridentata*). The predominant native vegetation of bunchgrass and sagebrush-steppe has been altered over the past years by agriculture and grazing practices. Although the project area receives an average of 10.5 inches of precipitation per year, plants requiring greater amounts of water can survive because of the presence of an extensive spring system (Thousand Springs) in the Hagerman Valley. The springs create a braided ecosystem of riparian habitats that are connected with riparian vegetation existing along the shoreline of the Snake River.

The Applicant divided the proposed project area into eight vegetation types. These vegetation types are: herbaceous riparian, woody riparian, wetland, shadscale, sagebrush, talus-cliff, agricultural, and disturbed-developed areas. The following number of acres of each vegetation type are present in the project vicinity: herbaceous riparian, 24; woody riparian, 205; wetland, 22; shadscale, 686; sagebrush, 2,406; talus-cliff, 544; agricultural, 1,533; and disturbed-developed, 146 (Figure 3-10). These acreage values are derived from data filed with FERC by the Applicant on September 11, 1981.

These vegetation types can be grouped into four types of habitat: riparian, grass-shrub, talus-cliff, and agricultural. The aggregate collection of vegetation and wildlife associated with each habitat constitutes the biotic community; thus, the following sections discuss the major plants and animals associated with the riparian, grass-shrub, and other terrestrial communities.

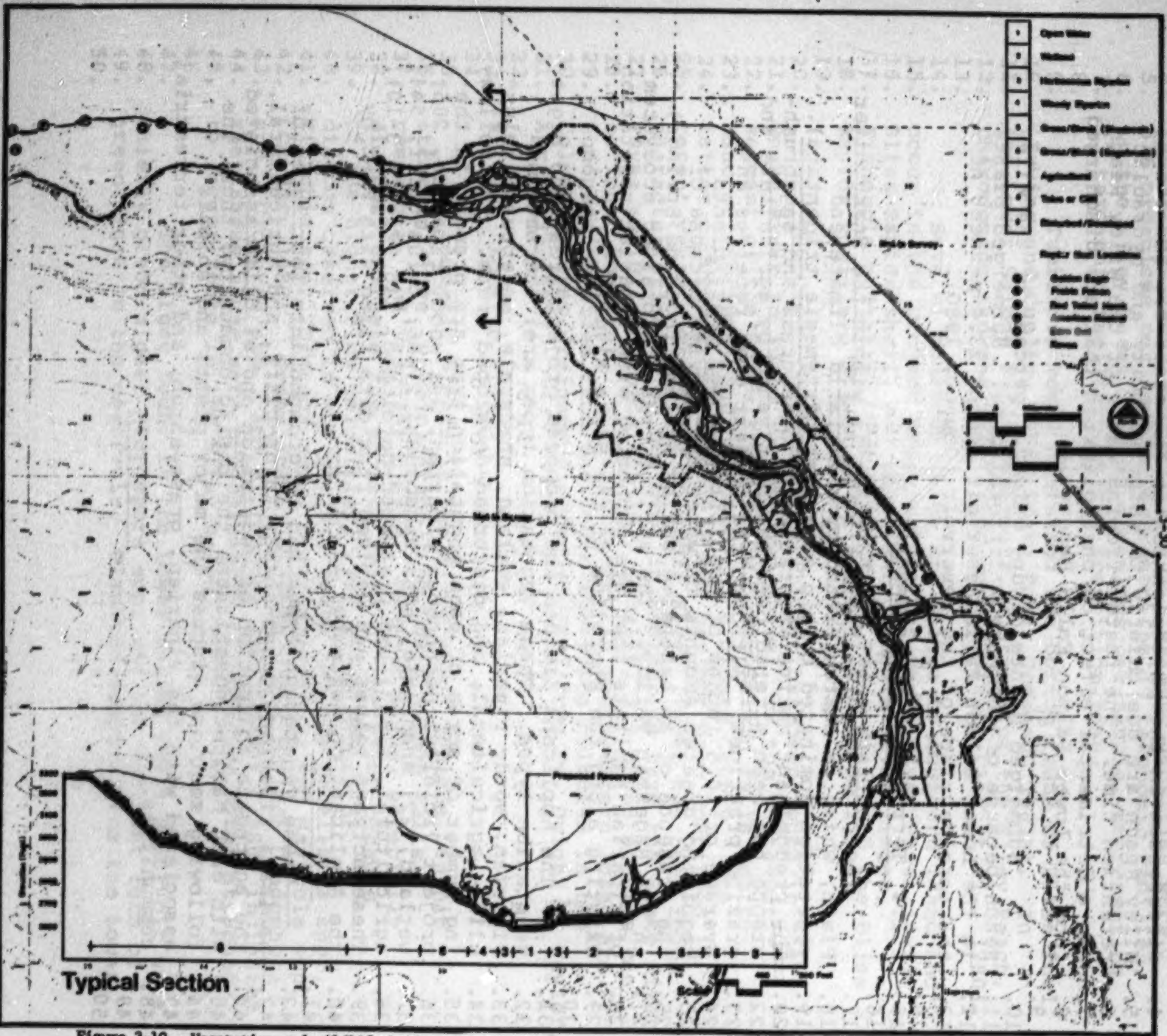

Open Water
Wetland
Herbaceous Riparian
Woody Riparian
Grass/Shrub (Shadscale)
Grass/Shrub (Sagebrush)
Agricultural
Talus or Cliff
Disturbed/Developed
Raptor Nest Locations
Golden Eagle
Prairie Falcon
Red Tailed Hawk
American Kestrel
Barn Owl
Raven
Proposed Reservoir
Typical Section
Scale
Feet

Figure 3-10. Vegetation and wildlife habitat in the project vicinity (Source: Idaho Power Company, 1981b, Application, Exhibit W).

3.1.4.1 Riparian Community

The riparian community is the most important community in the project area in terms of vegetation and wildlife. The riparian community in the project area is composed of three vegetation types: herbaceous riparian, woody riparian, and wetland. Less than 0.6 percent of the land area in Idaho contains riparian vegetation such as is found in the project area (Boccard, 1980).

Herbaceous riparian vegetation occurs along the banks of the Wiley Reach of the Snake River, mainly in a narrow band (1 to 6 feet wide) in the flood zone, which is the area between the high and low-water lines. It is characterized by herbaceous plants and low-growing (less than 3 feet) willows (*Salix* spp.). Common plants in this group are cocklebur (*Xanthium strumarium*), sneezeweed (*Helenium autumnale*), curly dock (*Rumex crispus*), beggar-ticks (*Bidens cernua*), meadow goldenrod (*Solidago occidentalis*), and sunflower (*Helianthus annuus*). Sedges (*Carex* sp.), dogbane (*Apocynum cannibinum*), and horsetails (*Equisetum arvense*) are also common.

The woody riparian vegetation is usually over 3 feet in height, and often has a herbaceous understory. The composition of this vegetation type varies, depending upon the slope of the terrain, the soil, and the proximity to water. Several distinct groupings of plants occur in this vegetation type. Willows and some cottonwoods (*Populus* sp.) occur along the banks of the river. There are also stands of native hackberry (*Celtis reticulata*), native water birch (*Betula occidentalis*), and squawbush (*Rhus trilobata*).

Hackberry and squawbush both form dense, nearly pure stand thickets, and occur in areas of moderate slope and fairly deep soil (Jensen and Verhovek, 1980). Large, well established stands of hackberry are unusual in the Southeastern portion of Idaho, and not often found in the State. Jensen and Verhovek (1980) speculate that the presence of these stands may be due to the presence of the Thousand Springs system. Other plants present in the woody riparian zone include American licorice (*Glycyrrhiza lepidota*), golden currant (*Ribes aureum*), cottonwood, black locust (*Robinia pseudo-acacia*), and the introduced Russian olive (*Eleagnus angustifolia*). The hackberry and squawbush riparian areas are present in less than 0.1 percent of the land area of Idaho; these riparian areas, not dominated by willow and cottonwoods, are ranked as the second most important wildlife habitat in Idaho (Boccard, 1980).

The wetland vegetation type occurs on shallow banks and low bars in the project area. The major plants of this type include stands of bulrush (*Scirpus* sp.), with common reed (*Phragmites communis*) and cat-tail (*Typha latifolia*) also present.

The herbaceous and woody riparian vegetation and wetlands in the project reach are patchy and interspersed, creating edge and structural diversity (MacArthur, 1964), and are also in proximity to other communities creating an area of value for many wildlife species. Johnson et al. (1977) note that the riparian communities have faunistic elements of the surrounding communities and also retain species that are not found in any of the other communities. Studies in other semiarid areas show that wildlife use riparian communities disproportionately more than any other type of habitat (Jensen, 1980; Olinger and Lee, 1980; Thomas et al., 1979; Stevens et al., 1977; Davis, 1977).

The riparian community provides three critical elements for wildlife: food, water, and cover. The presence of the riparian vegetation on the channel islands offers nest and fawning areas that are protected from predators and hunters. Many wildlife species are dependent on the riparian habitat for survival, including the California quail (*Lophortyx californicus*, marsh hawk (*Circus cyaneus*), and muskrat *Ondantra zibethicus*). Other species that occur in the riparian community, such as the montane vole (*Microtus montanus*), gopher snake (*Pituophis melanoleucus*), fox squirrel (*Sciurus* sp.), breeding song birds, and migratory birds, are important as prey for predators like the coyote (*Canis latrans*), bobcat (*Lynx rufus*), and hawks that use the riparian zone as feeding areas. The prairie falcon (*Falco mexicanus*) nests on the cliffs and takes medium-sized birds to feed its young (Snow, 1974). The riparian community is seasonally important to species like the chuckar (*Alectoris chuckar*), pheasant (*Phasianus colchicus*), and migratory birds, and is potentially important in the future for species that are in need of management, such as the mule deer (*Odocoileus hemionus*). Idaho Power Company (1981b); Bureau of Land Management (1980); Idaho Department of Fish and Game (1978); and Boccard (1980) list terrestrial vertebrates considered as sensitive species or species of major concern that occur or potentially occur in the project area.

The U.S. Fish and Wildlife Service (FWS) has ranked the Dike-Wiley Reach of the Snake River as the sixth most important habitat site in Idaho under the Unique Ecosystems Program (Boccard, 1980). The Wiley Reach of the Snake River has also been identified as an area of concern by the National Park Service, Idaho Department of Fish and Game (IDFG), Idaho Conservation League, Idaho Environmental Council, Friends of the Snake River, and Drs. Peter A. Bowler and Dwight Taylor (Boccard, 1980).

One of the reasons for the designation as an area of concern is that the unique assemblage of riparian plants in the Wiley Reach supports a rich diversity and a moderate-to-high density of wildlife not found in other areas. Riparian vegetation upstream of the project area above Lower Salmon Falls Dam is quite different in nature. Although there is woody riparian vegetation present, it is composed mainly of cottonwoods and nonnative Russian olive. Stands of hackberry and water birch are scarce in this area.

Below the proposed project area is the Bliss Reservoir. Except for a few Russian olive trees, almost no riparian vegetation has reestablished itself in the past 30 years because the slopes surrounding the reservoir are too steep.

Wildlife studies at Bliss and Lower Salmon Falls Reservoirs are limited; from inference and observation, however, there is limited potential at Bliss Reservoir to support a wildlife fauna equal to the Wiley Reach. The riparian community at Lower Salmon Falls Reservoir is not as structurally complex as the riparian community along the Wiley Reach and therefore would not have the same potential to support wildlife species.

3.1.4.2 Grass-Shrub Community

The most common community in the project area is the grass-shrub community. This community has been subdivided into two vegetational types, one dominated by shadscale (*Atriplex confertifolia*) and the other by big sagebrush. Shadscale and greasewood (*Sarcobatus vermiculatus*) are most often found north of the river, while on the south side of the river, big sagebrush and rabbitbrush (*Chrysothamnus nauseosus*) predominate. Native perennial grasses are not very common in the area because of grazing and semiarid conditions. The common grasses are cheatgrass (*Bromus tectorum*) and the widely seeded, crested wheatgrass (*Agropyron cristatum*).

Shadscale and sagebrush vegetation types are found in regions with a greater slope and shallower soil fraction than the regions in which squawbush and hackberry groves are found (Jensen and Verhovek, 1979). The grass-shrub vegetation is also found close to the river in areas where the slope is too steep to permit the establishment of hackberry or squawbush.

The grass-shrub community provides wildlife habitat for species such as the black-tailed jackrabbit (*Lepus californicus*), badger (*Taxidea taxus*), mule deer, coyote, and bobcat.

3.1.4.3 Other Terrestrial Communities

Very little vegetation occurs on the basalt cliffs and talus slopes in the vicinity of the project area. Where pockets of soil occur on the cliffs, bladder fern (*Cystoptires fragilis*) and buckwheat (*Erigeron* spp.) are found. The talus slopes support such plants as desert parsley (*Lomatium dissectum*), greasewood, horsebrush (*Tetradymia* sp.), and shaggy fleabane (*Erigeron pumilis*). *Astragalus purshii* var. *ophiogenes*, a plant which has a limited distribution, grows in the project area on cut gravel terraces and sandy sites. (See Section 3.1.5.)

The cliffs serve as nesting sites for such raptors as golden eagles (*Aquila chrysaetos*) and prairie falcons. The spotted bat (*Euderma maculatum*) potentially roosts in the rock crevices during the day and is considered a sensitive species by IDFG.

Some of the project area has been used for agriculture. Crops in the area include alfalfa, sugar beets, and potatoes. Pastures are found on steep or poorly drained sites.

3.1.5 Threatened or Endangered Species

The only Federally listed threatened or endangered species known to occur in the proposed project area is the bald eagle, which occasionally winters along the Wiley Reach of the Snake River (Letter to FERC from U.S. Fish and Wildlife Service, July 28, 1981). Although the bald eagle is the only listed threatened or endangered species, there are also six candidate species which may or do occur in the area. These include one fish, two snails, and three plant species. Candidate species are ones that are currently being reviewed by the FWS for inclusion on the list of endangered or threatened species. Candidate species have no protection under the Endangered Species Act of 1973, as amended, but they could later be formally proposed and listed during the proposed construction period. The review of the Shoshone sculpin, Snake River Physa snail, and Bliss Rapids snail was scheduled for completion in September 1982. At that time, the FWS may recommend that a candidate specie(s) be formally listed or that monitoring continue to take place.

The Shoshone sculpin (*Cottus greenei*) is a candidate fish species, and is also listed as a species of special concern by the Idaho Department of Fish and Game (1978). Shoshone sculpin have been collected in springs and spring-fed streams along the Snake River between Bliss Dam and Kanaka Rapids, but not beyond these points (Simpson and Wallace, 1978; Idaho Department of Fish and Game, 1978; Cochnauer, 1980a; Griffith et al., 1981, and Griffith, 1981). Griffith et al. (1981) showed that eight springs within the Wiley Reach support populations of Shoshone sculpin. Individuals were also captured in the mainstem Snake, about one-fourth of a mile upstream of Bliss Bridge (Cochnauer, 1980a).

The Snake River snail, an undescribed physid and candidate species, is found in the mainstem of the Snake River from below Lower Salmon Falls Dam to Bancroft Springs (Wiley Reach) on boulders in fast-flowing rapids (Letter to FERC from Dr. Dwight W. Taylor, April 23, 1982). Fossils of this snail have been found in Bear Lake and near American Falls Reservoir. Modern and fossil occurrences of the Snake River Physa snail indicate that it is a large-water species common to lakes and streams.

The Bliss Rapids snail, not yet formally named, is a distinct species and genus unique to southern Idaho (Letter to FERC from Dr. Dwight W. Taylor, April 23, 1982). This snail is known from Box Canyon as well as from the mainstem of the Snake River in riffles and rapids from below Lower Salmon Falls Dam to the mouth of Clover Creek above King Hill. No trace of the Bliss Rapids snail has been found below the white-water segment of the Snake River characterized by lava canyons and boulder bars. The Bliss Rapids snail has been found outside of the mainstem Snake River in southern Idaho.

Candidate plant species are presently listed in two categories. Category 1 is for taxa about which the FWS has sufficient information to support a listing of either endangered or threatened species. Category 2 is for taxa that available information suggests should be listed as endangered or threatened, but for which more data are required to make a final determination.

The following plants that could occur in the proposed project area are listed in the December 15, 1980, Federal Register as candidate species:

County	Scientific name	Common name	Category
Gooding	*Astragalus atratus* var. *inseptus*	Milk-vetch	1
Gooding	*Astragalus purshii* var. *ophiogenes*	Milk-vetch	2
Twin Falls	*Erigeron latus*	Fleabane	1

Staff's observation and Applicant's studies confirm that *Astragalus purshii* var. *ophiogenes* occurs in the proposed project area. As a result of research conducted under contract to the Applicant, the plant has been found to be more widespread than previously thought, and the FWS is recommending that the plant be dropped from candidate status (Packard et al., 1980).

3.1.6 Land Use

3.1.6.1 Existing Uses

The predominant use of land in the area surrounding the proposed project is for agricultural purposes, primarily irrigated crop production, and grazing. Most of the farming in the immediate vicinity is concentrated north of the river, but BLM is currently considering the conversion of public rangeland south of the river to irrigated crop use (Bureau of Land Management, 1980). The springs that discharge below the canyon rim on the north side of the river also support aquaculture in the form of trout farms (Figure 3-11).

The nearest urban areas are Bliss, a small community located approximately 1.8 miles northeast of the proposed dam, and Hagerman, another small community located approximately 9 miles upstream of the damsite. The project area is located on the boundary between Twin Falls and Gooding Counties. Both counties have comprehensive land-use plans that support agricultural use on the best soils, grazing, and low density residential development.

The presence of the springs that emerge from the canyon rim on the north side of the river, along with the associated riparian ecosystem, have attracted a relatively dense development of residences and small

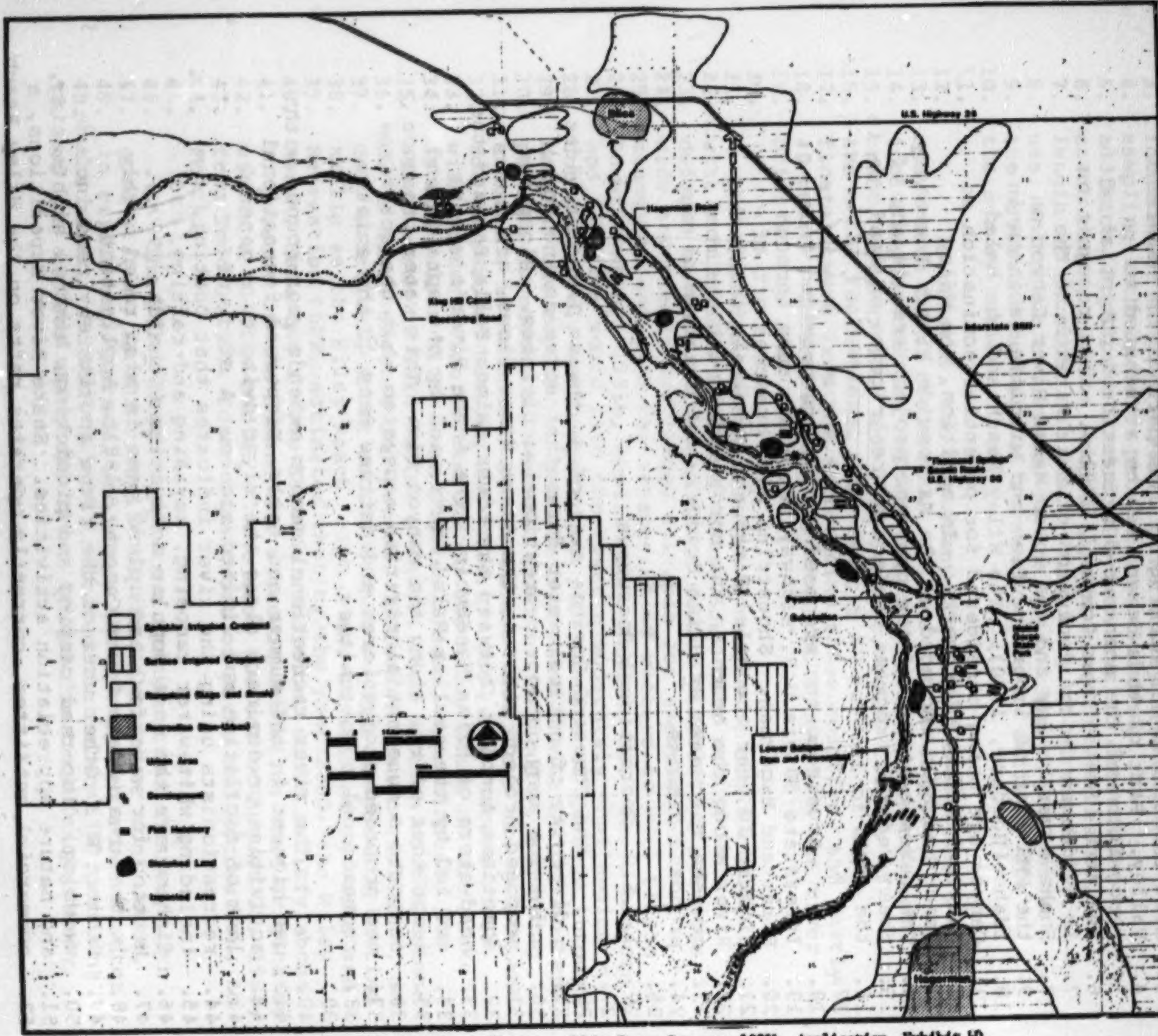

Sprinkler Irrigated Cropland
Surface Irrigated Cropland
Rangeland (Sage and Brush)
Recreation (Non-Urban)
Urban Area
Development
Fish Hatchery
Disturbed Land
Impacted Area
1 Kilometer
1 Mile
U.S. Highway 30
Interstate 80N
Bliss
Hagerman Road
King Hill Canal
"Thousand Springs" Scenic Route U.S. Highway 30
Substation
Lower Salmon Dam and Powerplant
Hagerman

Figure 3-11. Generalized land use (Source: Idaho Power Company, 1981b, Application, Exhibit W).

farms along the bench above the river. Some of the newer units are on land that is being subdivided to meet the demand for housing in this part of the Hagerman Valley. Part of this demand may be attributed to recognition of the scenic and recreational potential of the area (Idaho Power Company, 1981b). This recognition is evidenced by the inclusion of this stretch of the Snake River Valley and the lower Malad River Canyon on the FWS list of important fish and wildlife habitats in Idaho (Boccard, 1980). The Wiley Reach and the Malad Canyon are being considered for potential nomination as National Natural Landmarks. In addition, the Wiley Reach has been included on the Nationwide Rivers Inventory. The current status of the proposed project area in any of these Federal programs confers no restriction on land use in the area.

Access to the proposed project is provided from Interstate 80 via U.S. Highway 30, which runs through Bliss and Hagerman. Shoestring Road branches off of Highway 30 near the Malad River and parallels the Snake River along the bench on the north side until the road crosses the Snake at Bliss Bridge, just upstream of the proposed damsite.

3.1.6.2 Recreational Resources

The Thousand Springs area of southwest Idaho provides a diversity of natural water forms that serve as the focal point for many outdoor recreational activities. Along the proposed project stretch, the Snake River flows, and sometimes tumbles, between the Lower Salmon Falls Dam and the headwaters of Bliss Reservoir. The Snake River's waters are fed by the smaller Malad River, and by the springs and seeps that emerge along the canyon rim. This water presence supports a substantial riparian ecosystem that characterizes the proposed project area and defines many of the existing recreational opportunities.

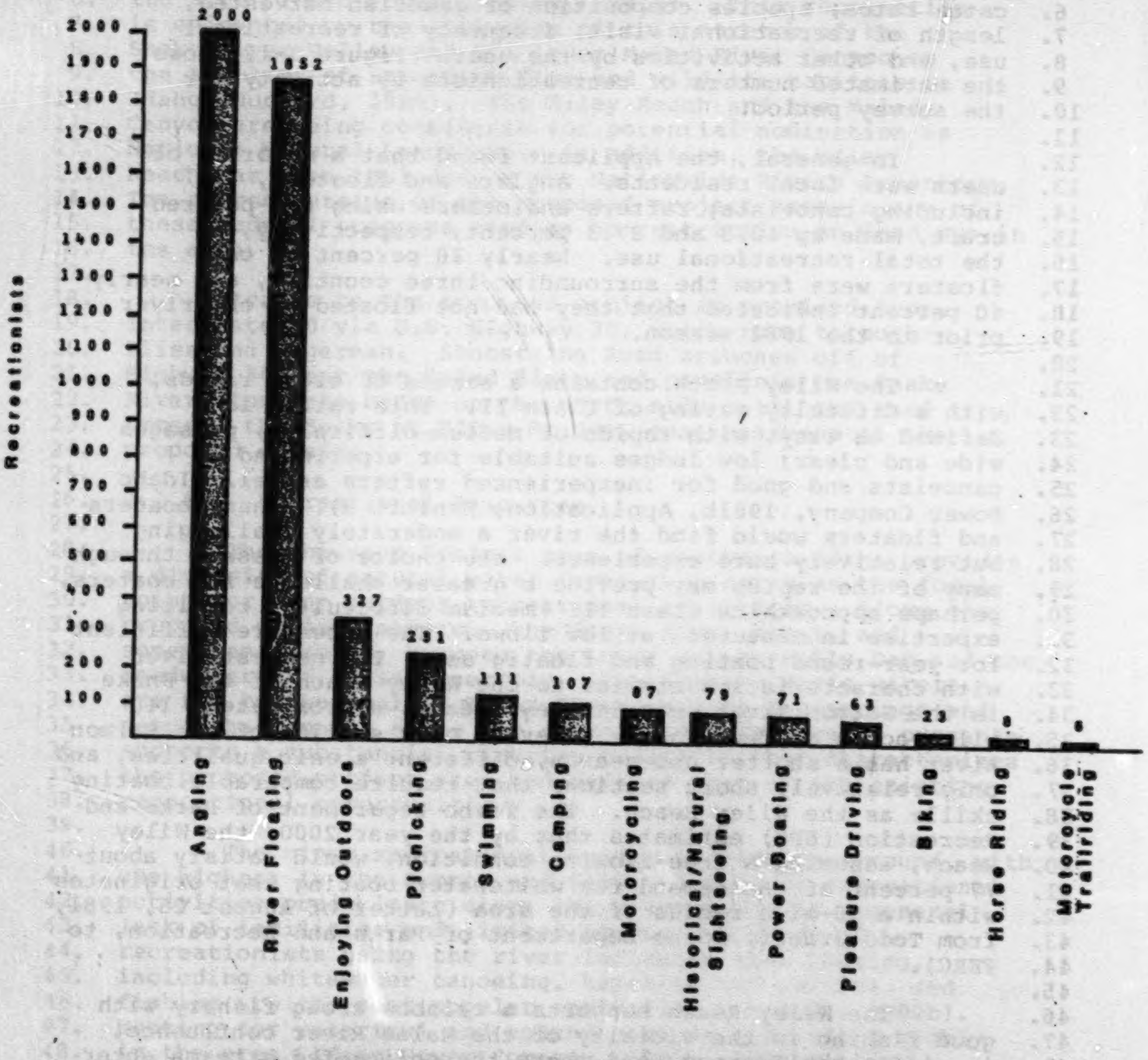
The river recreational season extends year-round, with use highest in the summer and fall. Dispersed recreational activities predominate along the river owing to a general lack of facilities and limited access. A study of recreationists using the river indicates that boating, including whitewater canoeing, kayaking and rafting, and fishing are the most popular activities (Schmidt, 1980b). Hunting for waterfowl and upland game is also rated highly in the area (Idaho Power Company, 1981b, Application, Exhibit R). Other uses of the river and its environs include swimming, dispersed camping and picnicking, hiking, sightseeing, and nature appreciation activities. Snake River Expeditions, a commercial outfitter, currently operates rafts on the Wiley Reach.

The Applicant conducted a survey of recreational use on the Wiley Reach from May 15 to October 2, 1981 Idaho Power Company (1981e). The survey used random sampling techniques to provide use estimaes. In addition, Applicant conducted interviews to determine catch rates, species composition of gamefish harvested, length of recreational visit, frequency of recreational use, and other activities by the user. Figure 3-12 shows the estimated numbers of recreationists by activity for the survey period.

In general, the Applicant found that a majority of users were local residents. Anglers and floaters, including canoeists, rafters and others using non-powered craft, made up 40.3 and 37.3 percent, respectively, of the total recreational use. Nearly 80 percent of the floaters were from the surrounding three counties, and nearly 40 percent indicated that they had not floated on the river prior to the 1981 season.

The Wiley Reach contains a series of eight rapids, with a dificulty rating of Class II. This rating is defined as easy, with rapids of medium difficulty, passages wide and clear; low ledges suitable for experienced canoeists and good for inexperienced rafters as well (Idaho Power Company, 1981b, Application, Exhibit R). Thus, boaters and floaters would find the river a moderately challenging but relatively safe experience. the choice of passage through many of the rapids may provide a greater challenge for boaters, perhaps approaching Class III (medium difficulty, requiring expertise in maneuver) at low flows. The flows are sufficient for year-round boating and floatig use. The nearest river with characteristics similar to the Wiley Reach of the Snake is the Salmon River near Stanley, Idaho, approximately 140 miles north of Twin Falls; however, this section of the Salmon River has a shorter use season, different scenic qualities, and only relatively short sections that require comparable boating skills as the Wiley Reach. The Idaho Department of Parks and Recreation (DPR) estimates that by the year 2000, the Wiley Reach, assuming a free-flowing condition, would satisfy about 77 percent of the demand for whitewater boating that originates within a 50-mile radius of the area (Letter of August 25, 1981, from Todd Graeff, Idaho Department of Parks and Recreation, to FERC).

The Wiley Reach supports a rainbow troug fishery with good fishing in the vicinity of the Malad River confluence, in riffle-rapid areas, and where the spring-fed streams enter the river. Schmidt (1980) indicated that almost 60 perecent of the anglers using the river fished for trout exclusively.



River Floating Includes: Rafting (97.57%, N = 1,807), Canoeing (1.08%, N = 20), Tubing (0.86%, N = 16) and Kayaking (0.46%, N = 9)

Figure 3-12. Estimated numbers of recreationists for entire study period (Source: Idaho Power Company, 1981e).

61 miles of the Snake River between Lower Salmon Falls Dam and C.J. Strike Reservoir, the Wiley Reach received the greatest angling pressure and produced the highest catch rate for rainbow trout (Idaho Power Company, 1981b, Application, Exhibit R).

Applicant's recreation survey estimated that fishermen spent approximately 4,582 hours angling on the Wiley Reach during the survey period, with a harvest of approximately 2,669 gamefish, and with peak fishing activity occurring in June (Idaho Power Company, 1981e).

The Wiley Reach has been included on the Nationwide Rivers Inventory. The inventory identifies outstanding rivers and river segments still remaining in a relatively natural condition that meet, at a minimum, the general criteria of the recreational river classification of the Wild and Scenic Rivers Act (Heritage Conservation and Recreation Service, 1980).

Existing recreational facilities in the Snake River Canyon between the Lower Salmon Falls and Bliss Reservoirs are limited to day-use areas and hunting-fishing access points (Figure 3-13). No fees are charged for using any of the existing areas. As a part of the Lower Malad Project, Applicant provides two small picnic areas, one on Highway 30 overlooking the Malad River gorge and one adjacent to the lower powerplant. Access is provided from Highway 30 to the mouth of the Malad River. At the Lower Salmon Falls damsite, Applicant provides a day-use area with picnic facilities and a boat launch for the reservoir. River access and parking are provided at the base of the dam. In addition, Applicant provides a day-use area and boat launch downstream at the Bliss Reservoir. River access is also available at the Bliss Bridge on Shoestring Road and from the public lands bordering the south side of the Snake River. A number of private landowners also permit access across their lands to the river.

The Malad Gorge State Park is located on the canyon rim above the Malad River and extends from an overlook of the Snake River eastward to Interstate Highway 80. Facilities include picnic areas and interpretive trails. Future plans for development include overnight facilities, an outdoor education interpretive center, and restoration of the Malad Stage Station-Kelton Road historic site.

The Idaho Department of Transportation (DOT) has designated Highway 30 between Twin Falls and Bliss as the Thousand Springs Scenic Route, one of a system of state scenic highways. The DOT maintains a scenic overlook about midway between Hagerman and Bliss that provides a panoramic view of a portion of the Wiley Reach and environs.

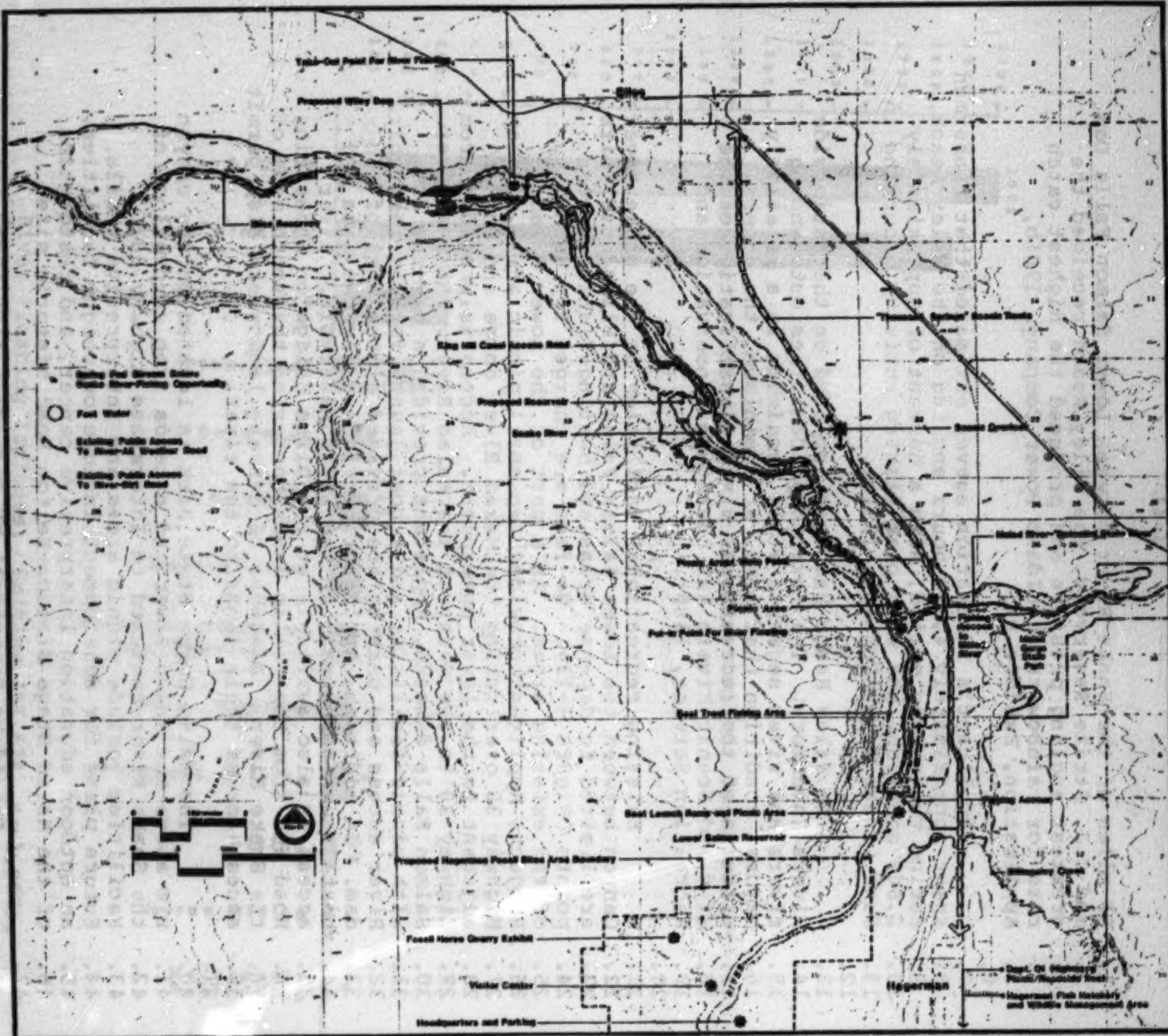

Take-Out Point For River Floating
Proposed Wiley Dam
Bliss
Bliss Reservoir
King Hill Canal Access Road
Proposed Reservoir
Snake River
"Thousand Springs" Scenic Route
Scenic Overlook
Picnic Area
Put-In Point For River Floating
Best Trout Fishing Area
Malad Gorge State Park
Fishing Access
Boat Launch Ramp and Picnic Area
Lower Salmon Reservoir
Billingsley Creek
Proposed Hagerman Fossil Sites Area Boundary
Fossil Horse Quarry Exhibit
Visitor Center
Headquarters and Parking
River
Hagerman
Dept. Of Highways Picnic/Roadside Rest
Hagerman Fish Hatchery and Wildlife Management Area
Public River-Fishing Opportunity
Existing Public Access To River-All Weather Road
Existing Public Access To River-Dirt Road

Figure 3-13. Existing recreational facilities in the Snake River Canyon (Source: Idaho Power Company, 1981e).

The recreational opportunities offered by the free-flowing Snake River in the proposed project area are limited in southern Idaho. The Statewide Outdoor Recreation Plan indicates that in the Springs Region, which includes the Thousand Springs area as well as the Sun Valley-Ketchum complex, river boating opportunities amount to 37 miles, including the Wiley Reach. By comparison, nearby lakes and reservoirs provide about 38,447 surface acres of flatwater recreational use (Idaho Department of Parks and Recreation, 1978).

In comparison to recreational opportunities at lakes and reservoirs, streams and rivers generally have few facilities and restricted access. But the streams and rivers are usually less crowded and more quiet, and are likely to occur in areas where nature predominates. The trend in river-oriented recreation is upward (U.S. Forest Service, 1977; Business Week, 1981). The trend applies not only to the wild rivers of the wilderness, but most especially to rivers close to population centers. The Wiley Reach of the Snake River is one of the few bodies of free-flowing water in south-central Idaho that provides a wide range of river recreational opportunities.

3.1.7 Visual Resources

A wealth of variety dominates the area where the Snake River and Snake River Canyon appear together in the landscape, much like the "ha-ha wall" that was used extensively in 18th and 19th century European garden design. From either side of the canyon in this general project area, the river is hidden from view in a 450-to-700-foot-deep canyon (rim to river). The proposed project area, generally centered on an 8-mile-long segment of the river between Hagerman and Bliss, Idaho, is aligned in a northwest-southeast orientation.

The canyon varies in width from rim to rim as does the degree of slope leading down to the river. The downstream (northwest) end of the canyon narrows to three-fourths of a mile and is oriented in a westerly direction. The lower portion of the canyon wall consists of steep talus or brush with the upper portions, particularly on the northeast side of the canyon, forming an almost vertical wall. In other areas the slopes continue unchanged to the rim. Slopes are topographically smooth in some places; elsewhere they consist of landslides that take on a more broken form. Above or outside the canyon rim is a level or rolling plain, either vegetated with grass and brush or barren and rocky. Tuana Gulch slopes north into the downstream area of the proposed project. This gulch and the plateau areas on either side are generally part of the project area through which the proposed project transmission line might pass.

For most of the length of the 8-mile segment, there is also an inner canyon 75 to 175 feet deep and 500 to 2,000 feet wide, rim to rim, cut into the main canyon floor. Generally, the full width of the floor of this inner canyon is filled by the Snake River. The inner canyon is usually centered between the main canyon rims, but in places, particularly north of the downstream end of the proposed project area, it approaches so close to the main canyon walls that a continuous slope exists between the river and the main rim. The walls of this inner canyon are steep and brushy, but in a few places there are only low vertical cliffs above the slopes. In a few locations, the walls slope so gently that the inner canyon cannot be said to exist.

The Snake River ranges in width from 100 to 500 feet, bank to bank, with a typical flow of between 5,000 and 15,000 cfs. The river drops about 85 feet within the 8-mile-long proposed project area. This drop occurs primarily in about eight groups of rapids, some up to 2,000 feet long. Four islands are located in the river channel within this river segment. About 1 and a half miles below the upper reach of the proposed project area is the only major tributary, the Malad River. Five other perennial spring-fed streams enter the river in the upstream 5 miles of the segment, all on the right bank.

Along the banks of the river and its tributary streams, herbaceous and woody riparian vegetation is found. On arid, level, and sloping areas, both above and below the canyon rim, a relatively sparse grass and sagebrush vegetation exists. In many places, however, the natural vegetation has been replaced by irrigated cropland. Between the rim of the inner canyon and the base of the main canyon walls, there are level, gently sloping, or rolling areas up to three-forths of a mile wide. These areas are more common, and wider, above the northeast (right) bank of the river.

North of the northwest end of the proposed project area, above the canyon rim, is the town of Bliss. South of the area's southeast end, on a very wide level area between the right bank of the river and the base of the canyon wall, is the larger town of Hagerman. These two towns are linked by a road that runs along the wide areas between the base of the main canyon slope and the rim of the inner canyon, northeast of the river. This is part of a state-designated scenic route (Thousand Springs Scenic Route). Immediately north of the Malad River, a branch of this road angles up the canyon wall and turns north to connect with Interstate 80 beyond Bliss. On this portion of road, near the canyon rim, is a scenic overlook, giving views of several miles of the canyon (and of the proposed project area). Shoestring Road branches off the main Bliss-Hagerman road about a mile south of Bliss, proceeds parallel to the river on its right bank for a mile, and then crosses the river by Bliss Bridge, the only public bridge over the Snake River in the proposed area. This road then turns west and continues in that direction on the left, or south, bank, out of the proposed project area. There are numerous other short, mostly private roads on the right bank of the river. On the left bank of the river, a network of roads exists between Bliss Bridge and a point opposite the mouth of the Malad River. On this bank, the level of development is less because vegetation is sparse and slopes are generally steeper. Another road leads south, out of the canyon, along the west rim of Tuana Gulch for about 2 and a half miles. There, it joins a network of ranch roads that cross the rolling upland areas southwest of this 8-mile stretch of river.

The now-abandoned King Hill Canal can be seen on the west bank, beginning opposite where the Malad River enters the Snake River, and proceeds downstream, gradually diverging from the river. The canal is a distinct, visually linear feature in the landscape for about 3 miles of its length within the proposed project area. The Lower Salmon Falls Dam, at the upper reach of the proposed project reservoir, is visually prominent, as is the Malad powerplant about 1 and a half miles downstream on the east bank. There is also a large substation midway between the Bliss-Hagerman Road and the river in this area. There are four transmission lines in and adjacent to the proposed project area. They all emanate from the switchyard on the east bank of the river, cross the river, and traverse the plateau area south and west of the proposed project. Communication and distribution lines associated with the rural, residential, and other types of development are found along most of the roadways.

Residences, farms, service structures, and commercial operations such as fish farms and hatcheries are scattered on the right (north-and-east) bank of the river, within the canyon, between Bliss and Hagerman. There is little development on the south or west sides of the river. Abandoned or operating gravel extraction pits are also scattered along the entire right bank of the river. All are relatively close to the river but above the inner canyon. The majority of the moderately level land between the canyon walls is irrigated cropland. This same type of irrigated agricultural land is found south of Tuana Gulch.

The great visual variety of the landscape might not be noticed by people driving on Interstate 80 outside the Snake River Canyon, but to those who have previously viewed this part of the river, the lure of the canyon, its walls, its irrigated cropland, and its blue-green water, would always beckon them back.

3.1.8 Cultural Resources

The Applicant has conducted an intensive archeological survey of the proposed project (Idaho Power Company, 1981b; Ostrogorsky, 1981; Ostrogorsky and Plew, 1979; Plew, 1981; Plew and Ostrogorsky, 1980). All direct and indirect impact areas have been inventoried with the exception of an island in the Wiley Reach area of the Snake River, i.e., the central portion of the project. A total of 19 prehistoric and historic sites were recorded during the survey (Table 3-7).

Test excavations were undertaken at 10GG1, 10TF350, 10TF351, 10TF352, and 10TF354 to determine the eligibility of these sites for the National Register of Historic Places (National Register). Sites 10GG1 and 10TF352 have yielded significant data relating to the prehistory and history of the area and region, and have been determined to be eligible for inclusion in the National Register of Historic Places. Sites 10TF350, 10TF351, and 10TF354 did not yield any significant data, and have been determined not eligible for inclusion in the National Register. Of the remaining sites, test excavations or historic record searches and documentation would be required to determine the eligibility of 10GG188, 10GG189, and 10TF455. The other sites in the inventory have not yielded significant data or do not have the potential to yield such information, and therefore do not appear to be eligible properties.

Prehistoric occupation of the project area appears to have occurred on a seasonal basis, and been confined to the period of the Archaic cultural tradition (4000 B.C.-A.D. 1700). The Archaic tradition was characterized by a hunting-and-gathering economy, and the exploitation of several distinct locations for seasonally available food supplies. During the later part of the tradition, it appears that base camps (or more permanent occupation areas) were located within or near the Snake River Canyon, and occupied during the winter. Food supplies appear to have been cached at base camps for use during the winter. Seasonal camps appear to have been located in a variety of areas, including other points in or near the canyon, and areas as far distant as the Camas Prairie. The historic Native American inhabitants of the project

Table 3-7. Archeological and historic sites inventoried in the vicinity of the proposed project. 1/

Site no.	Site type	Approximate date	Eligibility for the National Register of Historic Places	Location in Figures 4-3, 4-4, and 4-5
10GG1	Prehistoric campsite-possible camp	A.D. 1200-1700 and 1890-1910	Eligible	Wiley Dam area
10GG168	Historic trash dump	Unknown	Not eligible	Malad River area
10GG169	Historic trash dump	Unknown	Not eligible	Malad River area
10GG170	Historic rock cluster	Unknown	Not eligible	Wiley Dam area
10GG171	Historic rock wall	Unknown	Not eligible	Wiley Reach area
10GG188	Irrigation pump house	1920's or 1930's	Probably eligible	Wiley Reach area
10GG189	Prehistoric lithic scatter	700 B.C. - A.D. 600	Possibly eligible	Wiley Dam area
10FT349	Can and historic ceramic scatter	Unknown	Not eligible	Wiley Reach area
10FT350	Prehistoric lithic scatter	Unknown	Not eligible	Wiley Reach area
10TF351	Homestead-farm	1920-1930	Not eligible	Wiley Reach area
10TF352	Prehistoric	4000-700 B.C. and A.D. 600-1200	Eligible	Wiley Dam area
10TF353	Prehistoric rock alignment	Unknown	Not eligible	Malad River area
10TF354	Prehistoric lithic scatter	Unknown	Not eligible	Malad River area

10TF355	Historic rock alignment	Unknown	Not eligible	Malad River area
10TF356	Historic placer tailings	Unknown	Not eligible	Wiley Dam area
10TF455	Homestead	Early 1900's	Possibly eligible	Wiley Dam area
10TF456	Historic trash dump	Unknown	Not eligible	Wiley Dam area
10TF457	Historic gravel separating device	Unknown	Not eligible	Wiley Reach area
10TF458	Historic wooden structure (2)	Unknown	Not eligible	Malad River area

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1/ Ostrogorsky, 1981; Plew, 1981; Plew and Ostrogorsky, 1980.

vicinity, the Shoshonean Indians, were participants in the tradition prior to Euroamerican settlement of the area, and to the extensive use of the horse (Butler, 1978; Plew, 1979, 1981; Steward, 1938). No evidence, however, has been found for Shoshonean occupation of the sites in the cultural resources inventory.

Data recovered from test excavations at 10GG1 and 10TF352 in the vicinity of the Wiley Dam area suggest that both sites were seasonal camps for taking salmon on the Snake River, and, to a lesser extent, other locally available fauna. Faunal remains recovered at 10GG1 were extensive enough to suggest further that this site was occupied during the spring and early summer salmon runs on the river. Four components (or distinct occupations) were identified at 10GG1 dating to the late portion of the Archaic tradition (A.D. 1200-1700). Two components dating to the early Archaic tradition, an Elko-Humbolt component (4,000-700 B.C.) and a Rose Spring-Eastgate component (A.D. 600-1200), were identified at 10TF352. Site 10GG189 also appears to have been occupied during a portion of the early Archaic, specifically 700 B.C.-A.D. 600. Further investigations, however, would be necessary to establish a precise date for this occupation, and a site function. The remaining prehistoric sites in the inventory could not be dated or assigned a site function.

Sites 10GG1 and 10TF352 have yielded, and have the further potential to yield, significant information in the following areas: (1) the chronological ordering of prehistoric sites in the western Snake River Canyon; (2) the nature of prehistoric seasonal occupations within the western Snake River Canyon; and, (3) the applicability of Steward's ethnographic model of the Shoshonean Indian settlement-subsistence system (Steward, 1938) for describing the prehistoric occupations of the area. These sites may also contain significant information pertaining to other aspects of Idaho prehistory, such as the significance of artifacts characteristic of the Fremont Culture of Utah (A.D. 600-1200) in many Archaic sites of southern Idaho.

Historic occupation of the proposed project appears to have been peripheral to developments elsewhere in the vicinity. Sites of permanent residence are relatively few in number, and appear to have been occupied for short periods of time by marginal inhabitants of the area. The earliest dated historic site in the cultural resources inventory for the project is a component at 10GG1 that consists of the remains of three semisubterranean houses and an associated artifact scatter. The houses appear to have been a type occupied by Chinese miners in Idaho. Artifacts recovered during test excavations at the site tend to confirm an occupation by this ethnic group. A date of 1890-1910 has been assigned to the component. This occupation postdates several large-scale mining efforts for gold in the vicinity and may represent the exploitation of areas abandoned, or otherwise considered marginal, by Euroamerican miners. This pattern of exploitation by Chinese miners has been noted elsewhere in Idaho (Idaho State Historical Society, 1976; Ostrogorsky, 1981). The component has potential for yielding significant information on Chinese mining activity and patterns of resource exploitation by minority groups in the western Snake River Canyon and the state as a whole.

Euroamerican homesteads have been inventoried at sites 10TF351 and 10TF455 in the vicinity of the Wiley Reach and Wiley Dam area, respectively. Test excavations at 10TF351 have indicated that this site was the residence of a farmer. Occupation of the site is relatively short, and appears to have been confined to the period 1920-1930. This occupation overlaps the end of a boom period, and the onset of an economic depression in the Idaho farming industry (cf. Idaho State Historical Society, 1976), and may represent the temporary exploitation of marginal lands during favorable economic conditions. Site 10TF455 appears to be a small residential structure dating to the early 1900's. The significance of this occupation has not been established.

The only other datable historic site in the inventory is 10GG188. This site is a pumping station for transporting irrigation water from the Snake River to adjacent farmland areas. The station dates from the 1920's or 1930's and appears to be one of the earliest such facilities in the project vicinity. The internal equipment appears to be original and intact (Ostrogorsky, 1981).

3.1.9 Socioeconomic Factors

3.1.9.1 Demographic Considerations

The six counties that comprise most of the land area within commuting distance (75 miles) of the project are: Cassia, Elmore, Gooding, Jerome, Minidoka, and Twin Falls. Table 3-8 shows the population for each of the counties from 1940 to 1990. The 1990 projections are from the Idaho Power Company application for license, which came out before the 1980 censuss, thus, the application it contained the 1980 projections for the six counties that were relatively accurate, especially for the six-county total.

Table 3-8. Population of six-county area in Idaho, 1940-1990. 1/

Counties	1940	1950	1960	1970	1980	1990
Cassia	14,430	14,629	16,121	17,017	19,427	21,853
Elmore	5,518	6,687	16,719	17,479	21,565	24,126
Gooding	9,257	11,101	9,544	8,645	11,874	10,290
Jerome	9,900	12,080	11,712	10,253	14,840	20,479
Minidoka	9,870	9,785	14,394	15,731	19,718	20,901
Twin Falls	36,403	40,979	41,842	41,807	52,927	66,311
Six-county total	85,378	95,261	110,332	110,932	140,351	163,960

1/ Idaho Division of Tourism and Industrial Development (1977); K. Hansen, U.S. Department of Commerce, Bureau of Census, personal communication (1981); Idaho Power Company, Application, Exhibit W.

The city of Twin Falls (1976 population: 23,161) is the largest municipality in the six-county south central Idaho area. There were no other cities with a 1976 population over 10,000 within a 75-mile radius of the proposed Wiley Damsite. The city of Boise (1976 population: 92,901), the largest city of Idaho, is located 90 miles west of the project.

3.1.9.2 Employment and Income

The six counties have predominantly agricultural-based economies. The Twin Falls area has historically built its economic base on agricultural operations and the food processing industry. Farm-related production and manufacturing include vegetable processing, meat packing, sugar refining, dairy products, potatoes, grain, seeds, and emerging fish farming operations. Elmore County is an exception to the agricultural-based economy of the rest of the region. Economic development in Elmore County is tied to the level of activity at the Mountain Home Air Force Base, located in the southwest portion of the county (Idaho Power Company, 1981b).

Table 3-9 presents employment figures by broad industrial sources in 1974 and 1979. All six counties show a slight overall growth. This growth is due to a population increase and an increasing labor force participation rate. The number of construction workers, an important factor when examining project impacts, showed a slight gain for the six counties; 1,943 and 2,391 workers were employed in 1974 and 1979, respectively (Table 3-9). The Idaho Department of Water Resources projected employment of 2,564 by 1980 and 3,290 by 1990 for the six-county area. More than half this growth is expected to occur within Twin Falls County (Idaho Power Company, 1981b).

In Cassia, Gooding, Jerome, and Minidoka counties, farm income makes up 36.6, 28.4, 38.8, and 26.1 percent, respectively, of the total income (Table 3-10). In Elmore County, the military accounts for 40.2 percent of the total income. Income in Twin Falls County is more evenly distributed over the major industry sectors (Table 3-10).

3.1.9.3 Public Service

Twin Falls County, with 14,923 housing units in 1970, had over 40 percent of all housing units in the six-county area. The city of Twin Falls has five elementary, two junior, and one senior high school. The school system could handle an influx of 30 to 40 students, possibly more (Jenny Dougherty, clerk-treasurer, Twin Falls School District No. 411, to David Johnson of FERC staff, June 15, 1981, personal communication). Table 3-11 gives the community facilities in the major towns of Twin Falls and Gooding Counties.

Table 3-9. Employment by type and broad industrial sources in 1974 and 1979, for Cassia, Elmore, Gooding, Jerome, Minidoka, and Twin Falls Counties, Idaho. 1/

	Cassia		Elmore		Gooding		Jerome		Minidoka		Twin Falls	
Industry	1974	1979	1974	1979	1974	1979	1974	1979	1974	1979	1974	1979
Agriculture services, forestry, fisheries, and other	195	335	51	D	78	117	85	88	178	D	194	338
Mining	12	33	D	D	0	L	0	0	L	L	L	12
Construction	325	267	145	216	70	114	134	248	230	164	1,039	1,382
Manufacturing	2,028	1,554	130	266	131	354	1,035	998	1,647	2,129	2,638	3,731
Transportation and public utilities	254	229	282	295	196	255	137	196	208	191	1,309	1,395
Wholesale trade	209	526	D	D	95	246	356	533	194	D	1,449	2,092
Retail trade	1,483	1,451	704	853	526	402	469	618	782	610	3,906	3,939
Finance, insurance, and real estate	182	226	178	226	64	67	78	101	94	99	699	888
Service	877	1,027	386	371	349	533	374	529	496	489	2,639	3,034
Government												
Federal civilian	177	202	874	964	60	51	54	47	101	55	369	380
Federal military	169	135	3,905	4,262	88	73	114	96	154	130	406	319
State and local	952	1,001	723	978	623	712	436	531	952	1,110	2,565	2,989
Proprietors	1,728	1,872	748	806	1,322	1,319	1,564	1,670	1,806	1,787	4,045	4,460
Farm	1,141	1,210	1,062	1,126	641	680	627	666	1,195	1,268	1,313	1,394
Total employment	9,732	10,068	9,229	10,647	4,243	4,928	5,463	6,321	8,044	8,914	22,579	26,353

1/ U.S. Department of Commerce, 1981.
D Not shown to avoid disclosure of confidential information, data are included in totals.
L Less than 10 wage and salary jobs, data are included in totals.

Table 3-10. Personal income by major industry for Cassia, Elmore, Gooding, Jerome, Minidoka, and Twin Falls Counties, Idaho, 1979. 1/

Industry	Cassia		Elmore		Gooding		Jerome		Minidoka		Twin Falls	
	Income 2/	%	Income	%	Income	%	Income	%	Income	%	Income	%
Agriculture services, forestry, fisheries and other	2,141	1.6	D	—	804	1.8	752	1.0	D	—	3,499	1.2
Mining	311	0.2	D	—	-100	0.2	0	0.0	L	—	271	0.1
Construction	5,348	4.1	5,084	4.1	1,816	4.1	5,578	7.2	3,731	3.9	25,936	8.5
Manufacturing	20,126	15.4	4,311	3.5	4,884	11.0	11,497	14.8	30,038	31.9	45,711	15.0
Transportation and public utilities	4,251	3.3	5,054	4.1	4,006	9.1	2,557	3.3	3,965	4.1	24,217	7.9
Wholesale trade	7,588	5.8	D	—	3,381	7.6	6,747	8.7	D	—	29,427	9.7
Retail trade	14,568	11.1	7,962	6.4	4,107	9.3	6,133	7.9	6,202	6.5	38,528	12.7
Finance, insurance, and real estate	3,333	2.6	3,024	2.4	988	2.2	1,674	2.2	1,809	1.9	15,798	5.2
Service	12,275	9.4	4,142	3.3	4,505	10.2	7,077	9.1	5,767	6.1	38,773	12.8
Government												
Federal civilian	3,820	2.9	12,657	10.2	874	2.0	167	1.0	865	0.9	7,323	2.4
Federal military	427	0.3	49,909	40.2	191	0.4	258	0.3	334	0.4	881	0.3
State and local	8,731	6.7	7,969	6.4	6,238	14.1	4,422	5.7	9,326	9.8	28,168	9.3
Farm	47,864	36.6	17,745	14.3	12,573	28.4	30,119	38.8	24,817	26.1	45,262	14.9
Total Personal income	130,783	100.0	124,290	94.9	44,267	100.0	77,581	100.0	95,194	91.2	303,794	100.0

1/ U.S. Department of Commerce, 1981.
2/ All income figures in thousands of dollars
D Not shown to avoid disclosure of confidential information, data are included in totals
L Less than $50,000, data are included in totals.

Table 3-11. Community facilities inventory in Twin Falls and Gooding Counties. 1/

Facility	Twin Falls	Buhl	Kimberly	Filer	Hansen	Murtaugh	Castleford	Hollister	Bliss	Gooding	Hagerman
County courthouse	X									X	
City hall	X	X	X	X	X		X		X	X	X
City police	X	X	X	X			X			X	X
County sheriff	X	X								X	X
State police	X										
Fire station	X	X	X	X	X		X		X	X	X
Hospital	X									X	
Elementary school	5	1	1	1	1	1	1	1	1	1	1
Junior High school	2	1	1	1	1				1	1	1
High school	1	1	1	1	1	1	1		1	1	1
Library	X	X		X	X					X	X
Community college	X										
Parks	X	X	X	X	X				X	X	X
Community centers							X			X	X
Fair grounds				X						X	
Post office	X	X	X	X	X	X	X		X	X	X
Other federal offices	X	X	X							X	
Other state offices	X	X	X						X	X	
Sewer system	X	X	X	X	X	X				X	X
Sewer treatment	X	X		X	X	X				X	X
Water system	X	X	X	X	X		X	X	X	X	X

1/ Twin Falls County Joint Planning Council, 1976, and public officials of Bliss, Gooding, and Hagerman, to David Johnson of FERC staff, June 17, 1981, personal communication.

3.1.9.4 Taxes

Revenue for the six counties is derived from sales taxes, property taxes, and shared Federal revenues. The total market value of all property, property taxes collected, and sales tax income for each of the six counties in 1979 are presented in Table 3-12.

Table 3-12. Property value, property tax, and sales tax for 1979 in Cassia, Elmore, Gooding, Jerome, Minidoka, and Twin Falls Counties, Idaho. 1/

County	Market value of all property	Property tax collected	Sales tax
Cassia	$319,357,064	$3,516,262	$2,285,861
Elmore	319,310,848	2,944,586	1,179,340
Gooding	131,593,168	2,196,348	658,244
Jerome	215,992,336	3,085,294	617,301
Minidoka	249,297,584	2,819,307	1,069,054
Twin Falls	520,954,368	9,250,008	5,898,484

1/ McAlindin and Porter, 1980.

3.1.9.5 Housing

Table 3-13 shows 1980 housing data for the six counties that are within commuting distance (75 miles) of the project. Staff was not able to obtain any recent data on the level of housing vacancies (a key factor if construction workers have to move into the area. Staff therefore approximated the number of housing units that might be available by subtracting the number of households from number of housing units (shown in the next-to-last column of Table 3-13).

Table 3-13. 1980 housing statistics for six-county area in Idaho 1/.

County	Housing units	Number of households	Housing units minus number of households	Persons per household
Cassia	7,010	6,119	891	3.16
Elmore	8,055	6,832	1,223	2.92
Gooding	4,591	4,143	448	2.77
Jerome	5,531	5,084	447	2.90
Minidoka	6,876	6,192	684	3.12
Twin Falls	20,528	18,883	1,640	2.74

1/ Alan Porter, Idaho Division of Economic and Community Affairs, to David Johnson of FERC staff, June 1981, personal communication.

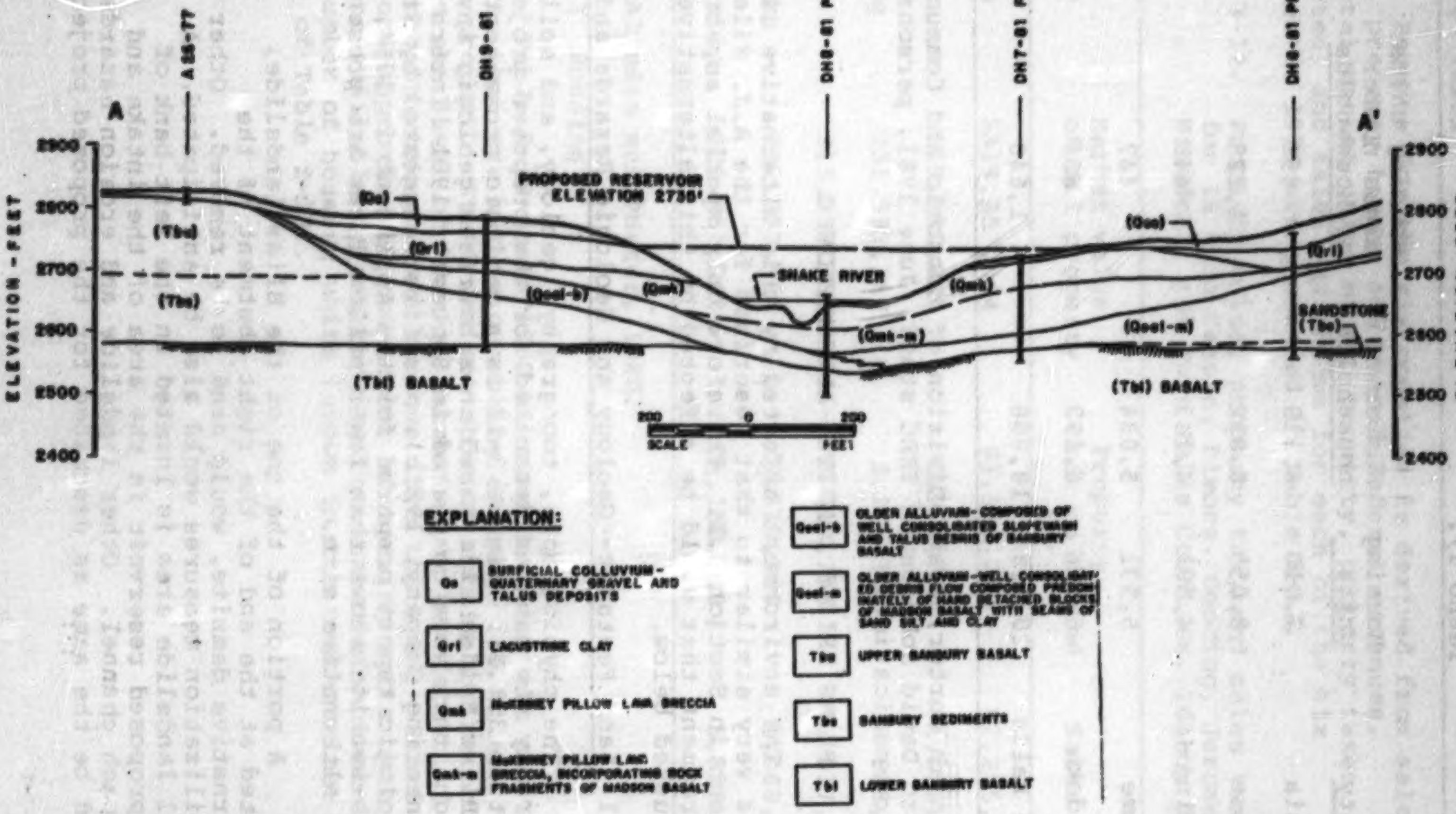
3.2 BLISS BRIDGE DAMSITE--ALTERNATIVE 1

The environment affected by this alternative is in most cases very similar to that described for the A.J. Wiley Project in Section 3.1. Therefore only special aspects of the environment that would be affected by this alternative are discussed below.

3.2.1 Land Features--Geology and Geologic Hazards and Problems

The physiography, topography, geology, and soils are generally the same as described for the proposed project (Section 3.1.2). Figure 3-14 is a geologic cross-section of the Bliss Bridge site based on subsurface geologic investigations that were completed in September 1981 (International Engineering Company, 1981c). As first suggested by Stearns in a geologic report prepared for the Applicant in 1954, the cross-section shows that fewer pillow lavas are present at this alternative site.

A portion of the toe of the Bliss landslide, located at the end of the right abutment of the alternative damsite, would need to be removed. Other stabilization measures would also be anticipated. A small landslide area is located in the left bank of the proposed reservoir in the area of the intake and approach channel. Other landslide and erosion hazards would be the same as described for the proposed project.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A'
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DH9-81
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DH7-81 PROJECTED 178'W
DH6-81 PROJECTED 150'E
ELEVATION - FEET
2900
2800
2700
2600
2500
2400
PROPOSED RESERVOIR ELEVATION 2735'
SNAKE RIVER
SANDSTONE (Tbs)
(Qs)
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(Qmb)
(Qmb-m)
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FEET
EXPLANATION:
Qs
SURFICIAL COLLUVIUM-QUATERNARY GRAVEL AND TALUS DEPOSITS
Qrl
LACUSTRINE CLAY
Qmb
McKINNEY PILLOW LAVA BRECCIA
Qmb-m
McKINNEY PILLOW LAVA BRECCIA, INCORPORATING ROCK FRAGMENTS OF MADSON BASALT
Qosl-b
OLDER ALLUVIUM-COMPOSED OF WELL CONSOLIDATED SLOPEWASH AND TALUS DEBRIS OF BANBURY BASALT
Qosl-m
OLDER ALLUVIUM-WELL CONSOLIDATED DEBRIS FLOW COMPOSED PREDOMINATELY OF HARD DETACHED BLOCKS OF MADSON BASALT WITH SEAMS OF SAND SILT AND CLAY
Tbu
UPPER BANBURY BASALT
Tbs
BANBURY SEDIMENTS
Tbl
LOWER BANBURY BASALT

Figure 3-14. Preliminary geologic cross-section of Bliss Bridge damsite, looking downstream (Source: International Engineering Company, 1981c).

3.3 COAL-FIRED, STEAM-ELECTRIC PROJECT--ALTERNATIVE 2

An alternative to the proposed hydroelectric project is a coal-fired, steam-electric plant, hypothetically located in south-central Idaho, about 2 miles east of Bliss. The resources of this area and the likely mine site that would produce the required coal are discussed in this section. It should be noted th[illegible] the land requirement of the proposed coal-fired plant is that associated with a 250-MW plant while the capacity needed to replace the installed capacity of the A.J. Wiley Project is only 86 MW.

3.3.1 Air Quality

The U.S. Environmental Protection Agency has classified areas of the country according to air quality. Class I areas are classified as wilderness areas with excellent air quality; Class III areas as urban or industrialized areas with poor air quality. The proposed coal-fired site would be located in an area that has an intermediate air quality rating and is classified as a Class II area. The air quality of the area of the plant is more fully described in Section 3.1.1. The location of Class I areas is an important factor in the siting of coal-fired plants, and other facilities that would have the potential to impair the air quality of these clean air areas. Craters of the Moon Monument and the Sawtooth Mountains Wilderness, both classified as Class I areas, are located about 50 to 75 miles east of the proposed plant site. Before building a coal-fired plant, the Applicant would be required to demonstrate that emissions from the plant would not adversely impact the air quality of these Class I areas.

3.3.2 Noise Levels

The low population density, light traffic levels, and slight industrial developments of the area keep general regional noise levels low.

3.3.3 Geology and Soils

Bedrock in the Central Snake River Plain consists of a series of lava flows that, in places, may include lake bed deposits, either at the surface or interbedded with the sheets.

Residual soils have formed on the older lava flows, occasionally masking them. In some areas, the soil cover consists primarily of thick deposits of fine, yellow, wind-blown dust called loess. Soil parent materials in canyon and stream valley bottoms and terraces include alluvial sand and gravel deposits, and occasionally, lake-laid clay and silt.

3.3.4 Hydrology

The coal-fired plant would be located at approximately elevation 3,200 feet msl, 3 miles from the Snake River, which ranges in elevation from 2,654 to 2,727 feet msl in the vicinity of Bliss. The aquifer, made up of basalt, varies in thickness from 10 to 50 feet. In general, the aquifer is very porous; vertical cracks and fissures permit water to percolate through the relatively dense basalt flows (Stearns and Roger, 1974). In the vicinity of Bliss, the aquifer discharges into the Snake River and water levels vary with irrigation demands and seasonal precipitation. At a domestic water-table well in Gooding County (Well 3256351143823010), water levels have ranged between 120 and 140 feet below the land surface datum (elevation 3,627 feet msl) from 1972 to 1977. Water level fluctuations generally average about 10 feet in a water year (U.S. Geological Survey, 1979).

3.3.5 Water Quality

The water quality of the Snake Plain Aquifer is suitable for municipal, agricultural, and industrial uses. The specific conductance of the ground water, measured at Well 424234711445071 in Gooding County during August 1977, was 520 micromhos per centimeter (umhos/cm). The water is classified as very hard (210 mg/l) because of relatively high calcium and bicarbonate concentrations of 46 and 230 mg/l, respectively. The pH of the water was 7.3 and the dissolved solids concentration was 320 mg/l (U.S. Geological Survey, 1979).

The quality of water in the Snake River in the vicinity of Bliss is influenced to a large extent by the inflow from the Snake Plain Aquifer and is described in Section 3.1.3.1.

3.3.6 Aquatic Communities

If the Snake River is used as the water source for a coal-fired plant near Bliss, the water would likely be taken from the free-flowing section between the Bliss dam and the Lower Salmon Falls dam. Fish in this reach include large-scale sucker, peamouth, redside shiner, northern squawfish, mountain whitefish, and rainbow trout. White sturgeon, which also occurs in this area, is considered a "species of special concern" by the State of Idaho (Idaho Power Company, 1981b). Their "restricted range, specific habitat requirements, and/or low population numbers make them vulnerable to elimination from the State if adverse impacts on habitat or populations occur" (Idaho Department of Fish and Game, 1978). Another species of special concern is the Shoshone sculpin (Cottus greenei), which occurs in springs and springfed streams along the mainstem Snake in the project area.

The Snake River snail (*Physa sp.*) and the Bliss Rapids snail are found in limited areas of the Snake River, including the Wiley Reach. The Shoshone sculpin, Bliss Rapids snail, and the Snake River Physa snail are listed as candidate threatened or endangered species: the status of these species is currently under review (Letter of July 29, 1981, from U.S. Fish and Wildlife Service to FERC).

3.3.7 Terrestrial Communities

3.3.7.1 Vegetation

The upland area in the vicinity of Bliss is located in the vegetation type known as sagebrush-steppe, according to Kuchler's (1964) classification of vegetation. The naturally occuring dominant plants in this shrub-grassland vegetation type are bluebunch grass and big sagebrush.

The area, however, has been overgrazed, and is now characterized as being a cheat grassland, with various European weeds and scattered sagebrush. Some of the area has been reseeded with crested wheat grass.

3.3.7.2. Wildlife Resources

The major fauna in the sagebrush-steppe vegetation are small- and medium-sized mammals that are prey for raptors, badgers, and coyotes. Raptors that characterize the Snake River Canyon include the rough-legged hawk (*Buteo lagopus*), ferruginous hawk (*B. regalis*), golden eagle, and prairie falcon, as well as several species of owl. The canyon is an important raptor nesting habitat, and the uplands are important hunting areas.

Winter range for mule deer and habitat with potential waterfowl value also occur near the Bliss site.

3.3.7.3 Threatened or Endangered Species

Wintering bald eagles occasionally occur along this area of the Snake River. No other Federally listed threatened or endangered species are known to occur in the area near Bliss. No site-specific studies have been conducted, however, to determine if any Federally listed threatened or endangered plants or animals occur at the proposed sites.

3.3.8 Land Use

The site analyzed for the coal-fired steam plant is located on the north rim of the Snake River Canyon in a sparsely populated area. The predominant land uses are irrigated cropland, pasture land, and rangeland (Figure 3-11). Crops produced in the area include potatoes, corn, and wheat. The surrounding undeveloped rangeland provides for wildlife habitat and such recreational uses as hunting and offroad recreation vehicle (ORV) use. The Union Pacific Railroad and Interstate 80 would be located adjacent to the proposed plant site.

3.3.9 Visual Resources

The landscape character of the immediate area of the proposed alternative coal-fired site is rural, with only minor changes in elevation within or immediately surrounding the proposed site. This lack of elevation leaves the site with little definition and even less variety. South and west of the site, the Snake River Canyon cuts its way through this relatively flat, indistinctive landscape. U.S. Highway 30 and Interstate 80 N are south and west of the coal-fired site, while U.S. Highway 26 is north of the site. Highway 30 was designated as a scenic route because of the views from the highway into the Snake River Canyon, as opposed to views to the east. An existing 230-kV transmission line extends through the proposed site, and there is railroad access adjacent to the site. Vision is extensive in all directions from within the site with little, if any, tall vegetation to attenuate those views.

3.3.10 Cultural Resources

An archeological survey has not been conducted of the potential coal-fired steam plant location. Archeological and ethnographic investigations that have been conducted in the immediate vicinity have indicated a relatively intense Native American occupation dating from Paleo-Indian times (12,000-5,000 B.C.) to the 19th century (Butler, 1978; Pavesic and Meatte, 1980; Plew and Ostrogorsky, 1980). Nonnative settlement of the Bliss area began in the 19th century, and became intense after the late 1800's, with the local development of farming and stock-raising industries. Major factors contributing to the growth of these industries, and to intense settlement of the area, were the removal of the native (Shoshone Indian) population to Fort Hall in 1869, construction of Union Pacific's Oregon Short Line railroad, establishment of the town of Bliss in the 1880's, construction of major agricultural irrigation projects in the vicinity during the early 1900's, and advances in agricultural technology (Idaho Power Company, 1981b).

There are no properties currently on or eligible for the National Register of Historic Places in the vicinity of the potential plant location.

3.3.11 Socioeconomic Factors

Socioeconomic factors are discussed in Section 3.1.9.

3.3.12 Mine Site

The Black Butte Coal Mine, the assumed source of coal for the coal-fired steam-electric generating facility, is located approximately 10 miles southeast of Point of Rocks in Sweetwater County, Wyoming. The mine has been in operation since 1979, and has produced a total of 4.31 million tons of coal (J. Hardaway, Office of Surface Mining, to Lon Crow of FERC staff, April 24, 1981, personal communication). The original proposal, submitted to the USGS in the form of a mining and reclamation plan, called for the disturbance of approximately 13,842 acres of land, and an annual coal production of approximately 6.3 million tons per year for 26 years (U.S. Department of the Interior, 1978a). The rate was based upon a contract from Commonwealth Edison and the Applicant for 3.0 and 3.3 million tons per year, respectively. The alternative 250-MW coal-fired plant evaluated in this impact statement would utilize 651,000 tons per year.

The coal seams that are mined, namely the Fort Union, Lance, Wasatch, and Almond seams, vary in thickness from 5 to 25 feet. Two or more coal seams are mined simultaneously, so as to allow blending of the poorer grade coals with higher grade coal, in an effort to meet the quality criteria specified by the utility company. The mining process essentially consists of the removal and stockpiling of topsoil, removal of overburden and placement of the overburden in previously mined cuts within the mine boundary, grading of mined areas to approximate the original contours, spreading of the topsoil over the graded areas, and establishment of vegetation cover (U.S. Department of the Interior, 1978a). At present, approximately 2,800 acres of land has been disturbed.

The mine presently occupies land that was devoted primarily to grazing, and is located within the Rock Springs Grazing Allotment that provides year-round grazing for sheep and cattle. This area is also devoted to such recreational activities as hunting, sightseeing, and ORV use.

Sagebrush, saltbush, greasewood, and juniper (*Juniperis sp.*) are the dominant plant species that comprise the vegetative cover of the mine site. This cover supports populations of sage grouse (*Centrocercus urophasianus*), prairie dog (*Cynomys leucurus*), coyote, mule deer, and pronghorn antelope (*Antilocapra americana*). Common raptors that occur in the area are the golden eagle, sparrow hawk (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), and prairie falcon. No Federally listed threatened or endangered plant species are known to occur in the area; however, the American peregrine falcon (*Falco peregrinus*) and the black-footed ferret (*Mustela nigripes*) may occur here.

Bitter Creek, an intermittent stream that drains the area to be mined, characteristically carries a high sediment load and does not support an extensive aquatic ecosystem. Shallow water aquifers exist within the Lance, Fort Union, and Almond Formations, and alluvial deposits; but the quality of water is generally considered to be poor because of high concentrations of dissolved solids.

The economy of Sweetwater County has shifted from an agricultural base to an industrial base within the past decade. The development of coal resources and the associated construction of power-generating facilities has resulted in a population growth of from 123 to 198 percent in some communities.

Section 4

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES, MITIGATION PROPOSED, AND UNAVOIDABLE ADVERSE IMPACTS

This section describes the impacts that are likely to result from the proposed action and alternatives. The impacts are related to specific aspects of the proposed action and alternatives, and are discussed in terms of their magnitude, importance, duration, and incidence.

Mitigative measures proposed by the proponents of the proposed action to reduce or eliminate certain adverse impacts are described.

Unavoidable adverse impacts are those that are likely to remain after the implementation of the mitigative measures.

This section also includes a tabular comparison of the effects of the proposed action and alternatives on the subjects discussed in Section 3, and a description of other state and Federal programs that may affect the Wiley Reach of the Snake River.

4. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES, MITIGATIVE MEASURES PROPOSED, AND UNAVOIDABLE ADVERSE IMPACTS

4.1 A.J. WILEY PROJECT

4.1.1 Air Quality

4.1.1.1 Beneficial and Adverse Impacts

Construction of the proposed facility would result in short-term adverse impacts on air quality. Exhaust emissions from construction equipment would cause increases in ambient concentration for such air pollutants as nitrous oxides, sulfur oxides, and carbon monoxide. Earthmoving activities in combination with the relatively dry climate could result in increases in the level of suspended particulates in the vicinity of Bliss.

4.1.1.2 Mitigative Measures Proposed

Proper maintenance of vehicles would minimize emissions from construction equipment. Periodic watering of the haul roads and other areas subject to heavy use would minimize the suspension of particulates in the vicinity of the construction site.

4.1.1.3 Unavoidable Adverse Impacts

It is probable that construction activities would significantly increase the concentration of suspended particulates in the immediate vicinity of the construction area. Blasting and various earth-moving activities during the dry season would result in localized increases in suspended particulates, but it is unlikely that this increase would significantly affect the populated areas of the canyon and plateau regions. No long-term impacts on air quality are anticipated.

4.1.2 Noise Levels

4.1.2.1 Beneficial and Adverse Impacts

Construction of the proposed facility would result in short-term and localized increases in noise levels at the damsite and surrounding areas. Noise would be generated primarily from the use of air compressors, construction equipment, and blasting. No significant impacts are expected to result from the measured noise levels resulting from construction of the facility.

4.1.2.2 Mitigative Measures Proposed

Noise levels would be required to be within limits defined as safe by the U.S. Occupational Safety and Health Administration.

4.1.2.3 Unavoidable Adverse Impacts

During construction of the facility, there would be increases in ambient noise levels that would originate not only from construction equipment but also from increased vehicular traffic of workers commuting to and from the project area. This increase may deter some recreationists from utilizing the project area during construction.

4.1.3 Geology and Soils

4.1.3.1 Beneficial and Adverse Impacts

Construction of access roads, excavations for dam and spillway construction, relocation of Shoestring Road, construction of a new bridge, excavation of borrow material, disposal of spoil material, construction of transmission tower foundations, and other construction activities would disturb soils and alter natural slopes and drainage. It would also remove protective vegetative cover and supportive root systems, thus increasing the potential for erosion of soils and other unconsolidated materials. The materials most susceptible to erosion would be fine-grained material, such as loess, clay, silt, and sand. The greatest potential for increased erosion during construction would be expected to occur at the damsite during excavation of the river channel and the right abutment.

Spoil materials (see Section 2.1.2.7) would include the complete range of particle sizes from very fine clay to large boulders and rock fragments. Clay and silt deposited in spoil area S-2, located entirely below the reservoir water level, would not be subjected to rain and surface runoff, but could be susceptible to erosion by currents within the reservoir. Erodable materials deposited at spoil areas S-1 and S-3 would be subjected to rainfall and surface runoff. Spoil area S-1, because of its proximity to the river, could be subjected to bank erosion.

A temporary increase in bank erosion would occur along the new reservoir shoreline during initial project operation. Because of the limited fluctuation of the reservoir level, however, the rate of bank erosion would be diminished with the establishment of a new shoreline equilibrium.

Landslide Potential

Landsliding, probably in the form of slumping, would continue to be a hazard at existing slide areas and at other potentially unstable areas, especially where reservoir inundation and saturation of marginally stable slope materials (clay) would cause the slopes to become weakened and unstable. The Applicant and FERC staff, however, have analyzed the landsliding potential of the slopes along the shore of the proposed reservoir and have determined that there would be no danger of large rapid landsliding that would endanger the public, or adversely impact the operation of the project, if constructed.

Soil testing performed on the clay deposits at the Bliss landslide indicates that the clay has an internal friction angle of about 20 degrees. The slope is very stable, with an overall slope angle of approximately 9 degrees from the canyon rim to the river (Figure 4-1). Nevertheless, some small hills within the slide area have slopes greater than 20 degrees, and minor, localized, shallow creeping and slumping would probably occur over time until no slopes are greater than 20 degrees.

The raised water level from the filling of the proposed reservoir could cause an increase in the rate of slumping of the steeper slope at the toe of the Bliss slide area. The upper slope is perched on a buried ledge of Upper Banbury Basalt, which is expected to limit the extent of possible localized minor slumping that might be aggravated by the presence of the reservoir (Figure 4-1). That portion of the slope that is above elevation 2,800 feet would not affect the reservoir or be affected by the reservoir (Figure 4-1). The toe of the slope could fail, as shown by the dashed line representing the soil surface after failure, but the localized slumping would not affect public safety or operation of the proposed project, if constructed (Figure 4-1).

Inundation and subsequent wetting of clay slopes along the south shoreline of the proposed reservoir would cause an acceleration of presently active slides, reactivation of some old slides, and formation of some new slides. Such sliding would be expected to be, at most, small areas of slow, shallow slumping or creeping types of slope movement of insufficient volume to produce any noticeable effect on reservoir capacity or public safety.

Foundation Conditions and Seepage

The geology of the proposed damsite, represented in cross-section in Figure 4-2, requires that certain foundation

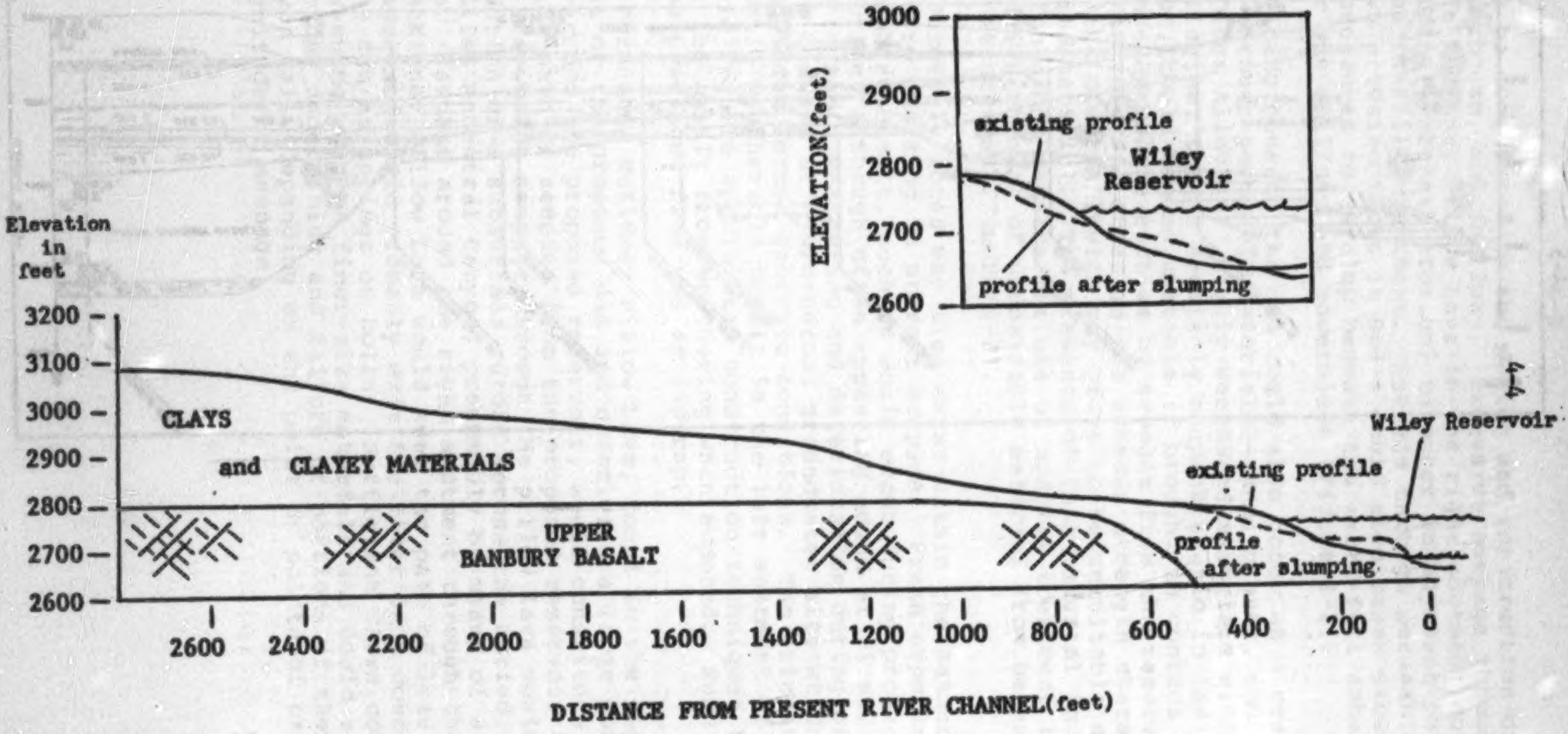
3000
2900
2800
2700
2600
ELEVATION(feet)
existing profile
Wiley
Reservoir
profile after slumping
Elevation
in
feet
3200
3100
3000
2900
2800
2700
2600
CLAYS
and CLAYEY MATERIALS
UPPER
BANBURY BASALT
Wiley Reservoir
existing profile
profile
after slumping
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
DISTANCE FROM PRESENT RIVER CHANNEL(feet)

Figure 4-1. Bliss landslide cross-section (Source: FERC staff).

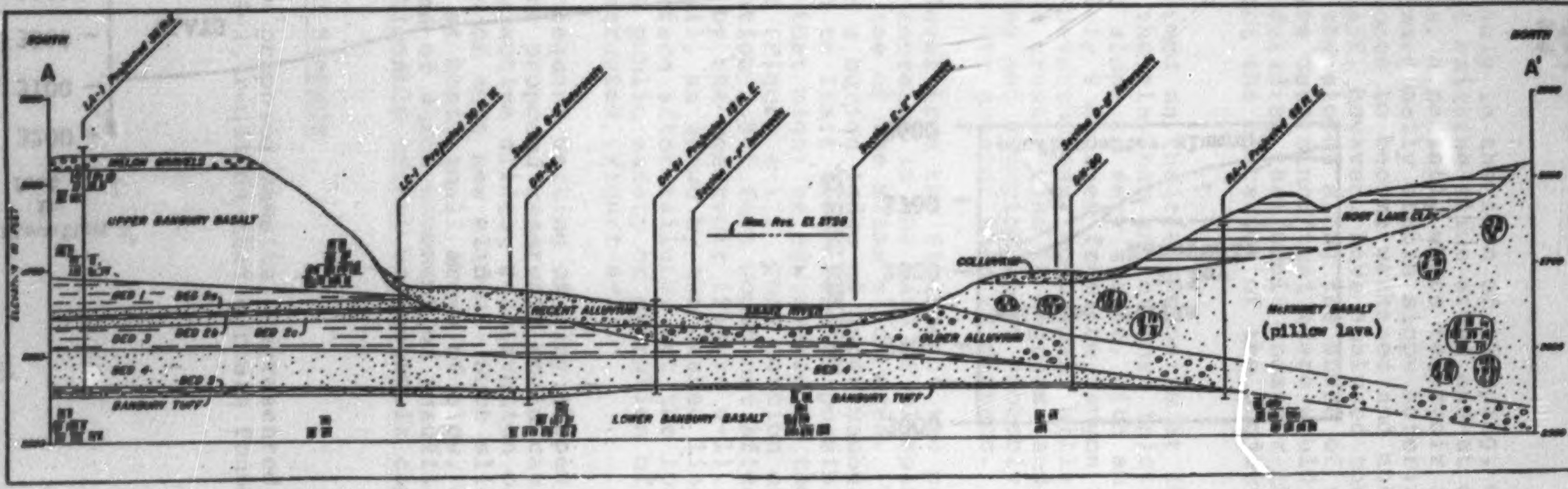
SOUTH
A
NORTH
A'
ELEVATION IN FEET
MELON GRAVELS
UPPER BANBURY BASALT
BED 1
BED 2a
BED 2b
BED 2c
BED 3
BED 4
BED 5
BANBURY TUFF
LOWER BANBURY BASALT
RECENT ALLUVIUM
SNAKE RIVER
OLDER ALLUVIUM
COLLUVIUM
McKINNEY BASALT
(pillow lava)
Max. Res. El. 2750
Section G-G' Intersects
Section F-F' Intersects
Section E-E' Intersects
Section D-D' Intersects

Figure 4-2. Cross-section of geology of proposed damsite (Source: Idaho Power Company, 1981b, Application, Exhibit L).

problems be considered in the design and construction of the dam, powerhouse, and spillway. Excessive seepage through permeable McKinney Pillow Lava in the right abutment could cause piping (internal erosion) to occur in adjacent portions of the earth-fill embankment. Seepage through permeable zones and known artesian flows in Bed 4 could also cause excessive uplift pressures to develop beneath the earth-fill embankment or under the spillway and powerhouse (Figure 4-2).

Piping beneath the dam could also occur as a result of seepage through permeable materials--sand, gravel, and boulders--in the Older Alluvium. Highly weathered materials within the Older Alluvium, though seemingly nonproblematic in the present condition, could become unstable if brought in contact with water under pressure such as by seepage from the reservoir. Because of this and other as yet unknown strength characteristics, the Older Alluvium may prove to be unsuitable as a foundation material. The presence of this material in the foundation might require the use of special treatment techniques or selective removal of undesirable material from beneath the project structures (Figure 4-2).

Permeable zones may also exist within the Banbury rocks and require grouting to prevent seepage. Fresh exposures of Upper Banbury Basalt, such as would occur during project construction, although often appearing sound at first, may be subject to rapid weathering and deterioration during prolonged exposure because of hydrothermal groundwater alteration that occurred under former geologic conditions. The existence of such highly weatherable basalt in the left abutment of the dam would require specialized construction techniques to protect the basalt from weathering when exposed. Such material would be precluded from use as rip-rap.

Permeable McKinney Pillow Lava, found in the right abutment of the proposed dam and underlying a large portion of the river and the proposed reservoir, would constitute a potential path of seepage from the proposed reservoir (Figure 4-2). Preventing seepage through the pillow lava would require construction of a subsurface cutoff across the buried, pillow-lava-filled Ancestral Canyon, presumably by means of a grout curtain. Seepage around the right abutment through the permeable McKinney Pillow Lava would seek the path of least resistance and would probably exit the river bank downstream from the dam as springs or boils. Sufficient flows could cause washing away of finer-size materials and could result in eventual undermining and failure of portions of the riverbank or canyon wall, depending on the point or points of exit and the magnitude of seepage.

4.1.3.2 Mitigative Measures Proposed

The Applicant's proposed general measures to minimize erosion at construction sites, borrow areas, and spoil areas include: (1) prompt reseeding of exposed slopes after completion of excavation; (2) protection of exposed slopes with mulch or netting until establishment of vegetation; (3) the use of small sedimentation traps along drainage courses leading from construction sites; (4) stockpiling of topsoil from borrow and spoil areas for use during final landscaping to facilitate revegetation; (5) the use of a coarse material covering in spoil area S-2 to protect fine silt and clay-size materials from exposure to reservoir water; (6) avoiding dumping of any spoil into running water; (7) possible placement of all silt and clay-size material in spoil area S-3 to avoid potential for erosion and increased turbidity in the Snake River; and (8) contour grading of borrow areas and spoil areas to eliminate steep slopes.

The Applicant has not proposed any mitigative measures to be taken to prevent minor slumping along the reservoir shoreline, but if any indication of large-scale slope movement were to occur, mitigative measures such as upslope drainage diversion or dewatering would be used by the Applicant.

Potential seepage through the base, joints, and fractures of the Upper Banbury Basalt and through Bed 2 in the left abutment would be minimized by sealing exposed joints and fractures with gunite or shotcrete. Exposed portions of Bed 2 would be covered with an impervious blanket of clay to prevent piping and if necessary, curtain and consolidation grouting would also be used. The Applicant proposes to minimize seepage through permeable surfaces of McKinney Pillow Lava exposed by excavation by sealing the surfaces with gunite. Subsurface seepage would be controlled by a grout curtain cutoff (Idaho Power Company, 1981f). The foundation beneath the dam would be cleared of all Recent Alluvium and slopewash material in order to minimize seepage. In order to relieve anticipated hydrostatic uplift pressures in Bed 4 and help ensure stability, a system of relief wells would be installed at the toe of the dam and a grout curtain would be used in the foundation.

4.1.3.3 Unavoidable Adverse Impacts

Minor erosion would occur during construction before mitigative measures, such as regrading and reseeding, could be implemented. Some minor erosion would be entirely unavoidable in areas where constant construction activity would preclude the effectiveness of mitigative measures. Minor unavoidable bank erosion and sloughing would be expected to occur along the reservoir shoreline.

4.1.4 Water Quantity and Quality

4.1.4.1 Beneficial and Adverse Impacts

Construction activities associated with the dam and tailrace, and the relocation of Bliss Bridge and Shoestring Road would not alter the flow pattern of the Snake River in the vicinity of the project. Construction of the dam would require dewatering a small area and would temporarily decrease groundwater levels near the site. All of these activities would also cause an increase in turbidity levels and suspended solids concentrations in the immediate and downstream river areas. Suspended solids would eventually settle out in the upper part of the Bliss Reservoir. Turbidity levels and the concentrations of suspended solids may be higher during the summer low-flow periods.

Spoil and borrow areas may also contribute to higher turbidity levels in the Snake River, especially if construction activities intercept groundwater or springs in these areas and and require dewaterings. Oils, grease, cement, and fine particulate matter may find their way to the river from equipment maintenance areas, concrete mixing plants, and increased dust levels caused by construction equipment. Generally, all of the above impacts would be limited to the construction period; the magnitude of these impacts would depend on the type of construction and river flow.

The major construction impact, however, would be to change 8 miles of free-flowing river to a 625-acre reservoir. The reservoir would impound 24,000 acre-feet of water at its normal level of operation and be approximately 75-feet deep near the face of the dam. The volume of water discharged through the Wiley Reservoir would remain essentially unchanged.

Completion of the Wiley Reservoir would eliminate the 8-mile free flowing reach and create a continuous series of reservoirs extending 20 miles from the Upper Salmon Falls Reservoir to Bliss Dam. If the Dike, Kanaka Rapids, Clear Lakes, and the Auger Falls hydroelectric projects are developed as proposed, all but a few small flowing stretches of the Snake River would be eliminated between King Hill and Shoshone Falls (Figure 4-3).

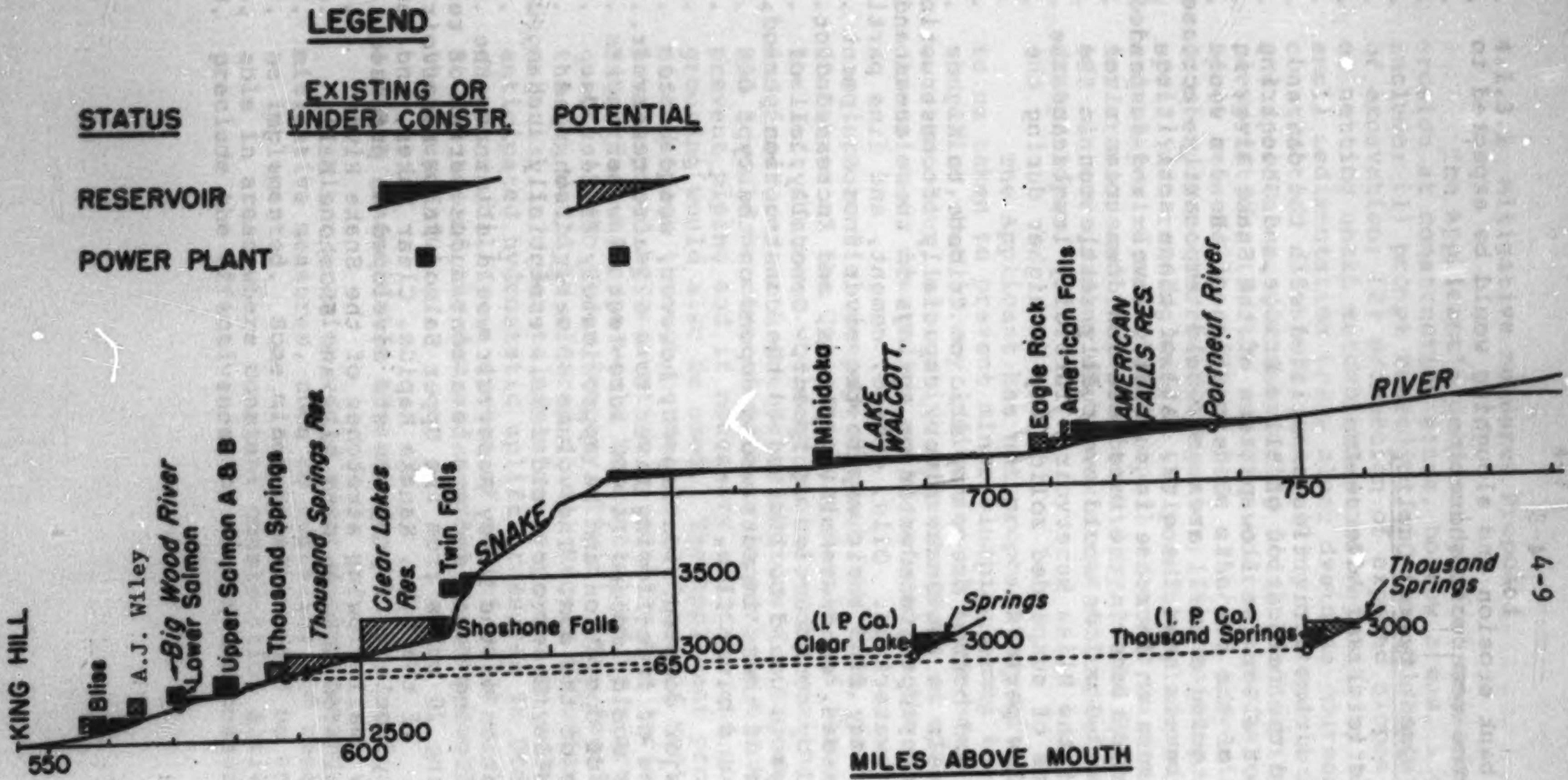

Figure 4-3. Profile of existing and potential hydroelectric projects in the Upper Snake River basin (Source: Federal Power Commission, 1967).

Some additional impacts of the reservoir include inundation of 500 feet of the Malad River and 45 feet of Lower White Springs and small tributaries. The reservoir would also encroach upon the tailwaters of the Lower Malad, and Lower Salmon Falls powerplants, and several small hydro powerplants. Water levels at the Lower Malad Powerplant would average 17 feet higher than under present conditions, while the water levels at Lower Salmon Falls would be 1 to 2 feet higher. The encroachment of the reservoir would result in a drop in power output of 1,500 kW at the Applicant's plant and corresponding decreases at the other small hydro projects. (See Section 1.1.)

The proposed reservoir would also inundate the toe of existing landslide areas and would result in increased sediment loads in the Snake River. (See Section 4.1.3.1.)

Groundwater levels in adjacent areas would increase to the level of the reservoir (2,735 feet). The higher ground water levels would not affect land-use activities in terrace areas of the inner canyon nor affect the water supplies of the town of Bliss (Idaho Power Company, 1981b). The Snake River Plain Aquifer would still discharge water to the Wiley Reach of the Snake River.

The Applicant indicated that the flow released from Lower Salmon Falls dam may vary by the hour and day by as much as 50 percent of the average monthly flow of 8,500 cfs. Given the above, and the information from International Engineering Company (1978), hourly and daily water level fluctuations in the river reach immediately below Lower Salmon Falls Dam are 2.4 and 1.0 feet, respectively, without and with the proposed A.J. Wiley Project. Under similar conditions, the hourly and daily water level fluctuations at the Lower Malad Powerplant are currently 2.3 feet and would be 0.2 foot with the proposed project. Water level fluctuations near the proposed project dam would be less than or equal to those experienced at the Lower Malad Powerplant. The 1-foot water level fluctuation in the upper part of the proposed project reservoir would mean that at least 25 acres of land would be dewatered and inundated during a given time period.

Applicant (Letter to FERC, July 20, 1982) indicated that the proposed project would have a normal reservoir elevation of 2,735 feet and would be operated with a reservoir fluctuation of no more than 1 foot below elevation 2,735.

The Applicant also indicated that a maximum 10-foot drawdown of the Wiley Reservoir would be allowed when rare and exceptional conditions occur. This would happen if one or more units of the Lower Salmon Falls Powerplant become inoperable or under repair and maintenance. During this time, the A.J. Wiley Project would operate at full capacity to supplement the temporary power loss at the Lower Salmon Falls Powerplant and also act as a temporary peaking plant.

Based on historical flow records and the Applicant's operational study (Idaho Power Company, 1981b, Application, Exhibit I), flows would be passed over the proposed spillway in 18 of the 48 years studied. Spills would occur at least once in every month of the period studied, except July, August, and September, although they were more common in April and February. Average monthly spill in August ranged between 139 and 13,689 cfs, and in February between 132 and 3,614 cfs.

At a spillway discharge of 13,700 cfs, the length of the stilling basin would be approximately 30 feet (Idaho Power Company, 1981b, Application, Exhibit I). The proposed spillway design would incorporate chute blocks, which are designed to dissipate the energy of the water being spilled and prevent it from plunging into the deeper part of the stilling basin. The design features of the spillway would reduce the potential for nitrogen supersaturation in excess of 110 percent.

During construction of the proposed dam, a cofferdam would be utilized. All flows would bypass the construction area and cofferdam, and no spills would occur. Thus, there is no potential for nitrogen supersaturation at the project site.

The creation of the reservoir would also result in evaporative losses that are greater than what presently occur in the river reach. Assuming that 3 feet per year are lost from evaporation, the total loss per year would be 1,875 acre-feet or 0.02 percent of the average total annual runoff (Idaho Power Company, 1981b, Application, Exhibit W).

As discussed in Sections 1.3.1.1, 3.1.2.3, and 4.1.3, the right abutment of the damsite is underlain by pillow lava and has been under study by the Applicant. The chief concern is potential seepage of the reservoir water through the pillow lava, which could affect water levels in Wiley and Bliss Reservoirs. The Applicant believes that any problems can be resolved with proper engineering design.

Hydrologically, the creation of the Wiley Reservoir would reduce water velocity and increase the time it takes water to travel through the 8-mile reach (hydraulic retention time). Water velocity measured by Connor (1980) during the summer of 1979 averaged 0.98 feet per second (fps) in the Wiley Reach, while velocities in the Lower Salmon Falls

Reservoir averaged 0.07 fps. Assuming that the A.J. Wiley Project would be operated like the Lower Salmon Falls Project during the summer, the Wiley Reservoir may have water velocities similar to Lower Salmon Falls Reservoir. If this is true, then the hydraulic retention time in the Wiley Reach would increase from 0.5 to 7 days if the reservoir was constructed. The estimated hydraulic retention time of the Snake River between Bliss Dam and the Upper Salmon Falls Dam during the summer months is presently 11 days; this would increase to 18 days if the project was constructed. These retention times are estimates for a summer period and represent the longest times for a typical year. Development of the proposed hydroelectric projects upstream and downstream of the Wiley Reach would increase the hydraulic retention time of the Upper Snake River still more, and may affect water quality in the reservoir to a greater extent.

After filling, the Wiley Reservoir would initially contain high concentrations of dissolved and suspended solids, nutrients, and metals from lands that would be inundated during the time the reservoir was filled. These conditions would persist for a number of years until the decomposition of the inundated vegetation and other materials had significantly progressed. This change in reservoir water quality may affect some of the fish species that would be planted as part of the fishery mitigative program. In any event, the reservoir would retain a larger quantity of suspended solids than the existing river.

The potential for thermal stratification in the proposed reservoir was determined by calculation of a Reservoir Froude Number (RFN) developed by Orlob (1969). The RFN is calculated by using reservoir volume, length, mean depth, discharge, reference density of water, average vertical density gradient, and acceleration of gravity. The RFN for the proposed A.J. Wiley Reservoir was found to range from 2.38 to 3.96 at the minimum daily flow of 7,073 cfs and the average daily flow of 10,160 cfs. Reservoirs with RFN values in this range would not be expected to stratify thermally.

Increased dissolved oxygen, pH, and temperature levels that may occur near the shoreline areas of the reservoir may also increase the frequency of toxic unionized ammonia concentrations in specific areas, especially where fish farm effluents enter the reservoir.

Staff utilized a mass balance model to predict the degree of eutrophication and total phosphorus concentration in the proposed A.J. Wiley Reservoir. The model was developed by Vollenweider (1968) and modified by Dillon (1975) to include phosphorus retention and hydraulic flushing rate. Staff calculated a total phosphorus loading of 217 and 221 $g/m^2/yr$ for the proposed reservoir assuming high streamflow (1978 water year) and low streamflow (1961 water year) conditions, respectively (Table 4-1a).

Table 4-1a. Summary of morphometric, hydrologic, and phosphorus budget for the proposed A.J. Wiley Reservoir for the 1978 water year and 1961 water year. 1/

		1978	1961
Drainage area (km^2)	A_d	90,650	90,650
Reservoir area (km^2)	A_o	2.53	2.35
Drainage area of water body	$A_d A_o$	35,830	35,830
Volume ($10^6 m^3$)	V	29.59	29.59
Mean depth (m)	Z	11.7	11.7
Total discharge ($10^6 m^3 yr^{-1}$	Q	7,637	6595
Flushing rate (yr^{-1})	p=Q/V	258	223
Phosphorus retention	R	.059	.060
Aerial loading ($gm^{-2} yr^{-1}$)	L	221	217
Aeiral loading (phosphous retention and flushing rate)	L(1-R)/p	.806	.915

1/ Source: Staff, modified from Vollenweider, 1968, and Dillon, 1975.

Because the proposed reservoir would have a large ratio of drainage basin to lake area (35,830) and a relatively shallow mean depth (11.7m), it has a high flushing rate (Table 4-1a). The volume of the proposed reservoir would be replaced between 223 and 258 times per year, assuming run-of-river operations. The high flushing rate also accounts for the relatively low phosphorus retention coefficient of .059-.060 compared to other lakes in the literature (Larsen and Mercier, 1976).

The parameter L(1-R)/p plotted against the mean depth, indicates that the proposed reservoir would still remain eutrophic at about the same level as the existing riverine reach (Table 4-1a and Figure 4-3a).

The equation [P]=L(1-R)/zp was developed by Dillon and Rigler (1975), and used to predict total phosphorus concentrations; it resulted in .068 mg/l of total phosphorus for the proposed reservoir during the 1961 and 1978 water years, and 0.07 mg/l for the existing riverine system. Based on the above information, the degree of eutrophication of the proposed reservoir would be about the same as currently exists in the Wiley Reach even though the predicted reservoir total phosphorus concentration was somewhat lower. If, however, the project was not

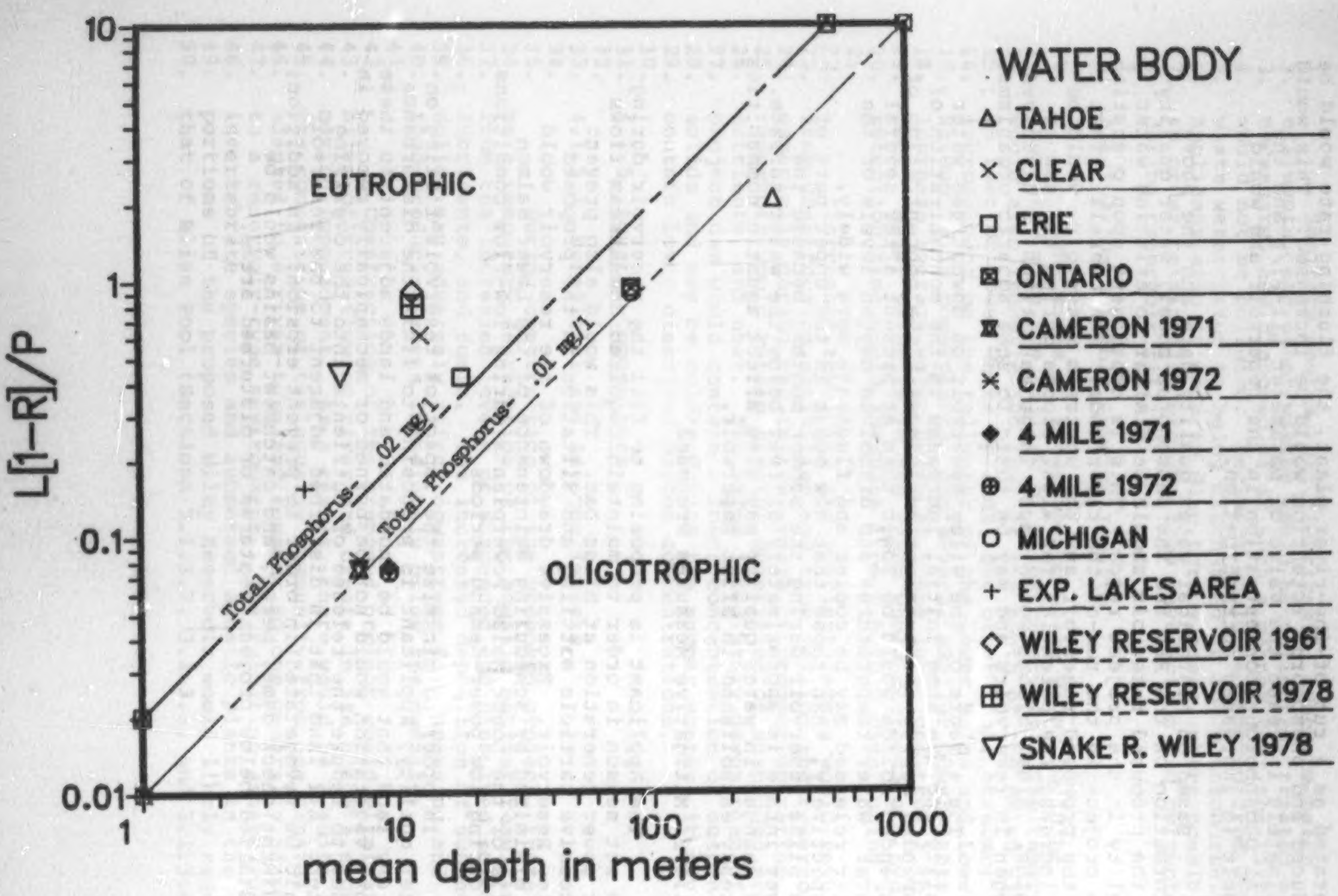

Figure 4-3a. Trophic classification of the proposed A.J. Wiley Reservoir as compared with the existing Wiley Reach of the Snake River and other lakes and reservoirs (Source: modified from Dillon, 1975).

operated as a run-of-the-river plant, the flushing rate would be reduced and phosphorus retention would be increased. This would ultimately increase the value of parameter L(1-R)/p and the total phosphorous concentration in the reservoir and would result in increased eutrophication.

Based on historical water quality data and the above information on the RFN and the phosphorus model, water quality in the proposed reservoir should be similar to existing water quality in the project reach. This is contingent upon operating the project in the run-of-the river mode. The overall effect of the proposed reservoir and the upstream reservoirs would be to increase the potential for algal blooms during the summer months. Algal blooms would cause large variations in dissolved oxygen in reservoirs and may be toxic to some aquatic organisms.

The effects of the Wiley Reservoir on downstream water quality include some initial increases in the concentration of suspended solids and nutrient substances. The concentration of suspended solids would be lower than at present after several years. Water temperatures and dissolved oxygen levels of the water released may be cooler and fluctuate more widely, respectively, than those that now occur in the upper part of the Bliss Reservoir during the summer months, because the power intake is approximately 81 feet below the water surface. The changes in water quality may also affect aquatic communities already established in Bliss Reservoir.

4.1.4.2 Mitigative Measures Proposed

The Applicant is proposing to fill the reservoir during the wet season in order to maintain required downstream flows for power generation at Bliss Dam. This would also prevent excessive particle settling and siltation in the proposed Wiley Reservoir. Excessive drawdown of the reservoir would be minimized by scheduling maintenance of the Lower Salmon Falls or the Lower Malad Powerplants during low-flow conditions or during low power-demand periods.

In order to minimize the impact of reservoir filling on water quality, Applicant is proposing to limit the disturbance of any land that would be inundated and lands adjacent to these. Thus, vegetation would not be burned or mechanically removed in order to reduce the release of nutrients into the overlying water. All land that is disturbed adjacent to the reservoir would be revegetated in order to prevent erosion. In addition, sediment check dams, berms, and catchment basins would be installed below project features or disturbed areas.

Sanitary wastes, oil, lubricants, concrete batch effluents, and other wastes would be collected, treated as necessary, and disposed of in such a manner that the river would not be polluted. Sediment would be removed from gravel waste water prior to being discharged in any watercourse. The Applicant also intends to dike borrow areas, where possible, in order to minimize erosion from wave action and currents during reservoir filling.

4.1.4.3 Unavoidable Adverse Impacts

Eight miles of free-flowing Snake River would be inundated with the filling of Wiley Reservoir. The reservoir would also inundate 500 feet of the mouth of the Malad River, 45 feet of Lower White Springs, and other small streams; encroachment on the tailwater of the Lower Malad and Lower Salmon Falls powerplants, and several smaller powerplants, would increase average water depth at these locations from 1 to 17 feet. Water velocity in the reach would decrease and hydraulic retention time would increase from 0.5 to 7 days during the summer.

Increased turbidity and nutrient levels would result from construction activities and from filling the reservoir, especially during the initial years of project operation. The reservoir would retain greater quantities of suspended sediments, nutrients, and heat. The water immediately downstream of the project dam would contain a lower concentration of suspended solids and may be colder during the summer months; it may also contain lower dissolved oxygen concentrations.

4.1.5 Aquatic Communities

4.1.5.1 Beneficial and Adverse Impacts

During construction of the proposed project, there would be a temporary degradation of the aquatic habitat resulting from the increased levels of suspended and dissolved solids, lubricants, and fuels. The increased deposition of suspended solids may adversely affect downstream fish spawning and food-producing areas immediately below the damsite.

Construction of the proposed project would eliminate 8 miles of free-flowing river and create in its place a slow-moving impoundment. As a result, there would be a shift in the composition of the aquatic community from one generally adapted to a river-type environment to one generally adapted to a reservoir-type environment. The resulting assemblage of invertebrate species and submersed aquatic plants in the portions of the proposed Wiley Reservoir would likely resemble that of Bliss Pool (Sections 3.1.3.2, 3.1.3.3, and 3.1.3.4).

The numbers of game fish such as rainbow trout and mountain whitefish would be reduced, and there would be a general reduction in species diversity. Rainbow trout and mountain whitefish spawning areas would be reduced or lost in the mainstem Snake. Additional trout-spawning habitat would be lost by inundation of the mouths of tributary streams such as the Malad River and Lower White Springs. Spawning habitat, if it exists in this reach, would be eliminated for white sturgeon. In addition, white sturgeon rearing habitat would be reduced or eliminated. With the loss of fast-flowing river habitat and reduced numbers of game fish, a reduction in recreational use of the Wiley Reach by anglers would be expected. Warmwater game fish species such as smallmouth bass may be better suited to Wiley Reservoir conditions, but their potential success is unknown.

Impacts on the Shoshone sculpin, Snake River Physa snail, and Bliss Rapids snail are discussed in Section 4.1.7.

There would be some mortality associated with passage of fish through the turbines. Studies conducted at other hydroelectric projects in the northwest indicate that the mortality of outmigrating salmonid smolts could be as high as 30 percent, including predation on injured fish (Ebel, 1977). Mortality of salmonids larger than six inches would be even greater.

The density and diversity of benthic invertebrates would be reduced in the proposed impoundment. The species assemblage would shift from that presently found in the free-flowing area of the Wiley Reach that is dominated by caddisflies, mayflies, and lepidopteran insects to one likely dominated by chironomids (midges) and tubificids. Mollusks that are dependent on fast-water would be eliminated by the proposed reservoir.

There would also be a shift from a benthic flora dominated chiefly by diatoms to one likely composed of green and bluegreen algae that are free floating. Algal blooms may occur during the summer when water temperatures are high and plant production is at its peak.

In summary, the construction and operation of the Wiley Reservoir would result in longer retention times and slightly higher concentrations of dissolved and suspended nutrients. The resulting combination of lower water velocity and greater retention of heat would be reflected by the types and quantity of aquatic plants in the reservoir. Phytoplankton would replace the periphyton communities that colonize various substrates in the present reach. During the summer, algal blooms may occur in the Wiley Reservoir, since nutrient concentrations are not growth limiting; phytoplankton entering the

Wiley Reservoir from Lower Salmon Falls Reservoir would not be destroyed by greater flow velocities that presently exist. In effect, the Snake River between Bliss Dam and Upper Salmon Falls would act as one reservoir and be conducive to increased algal production, which may cause DO levels in the reservoir to fluctuate more than they do now.

4.1.5.2 Mitigative Measures Proposed

The Applicant proposes to utilize erosion control measures during construction to minimize the impacts of sediment runoff into waters of the project area. These include bank stabilization and erosion control structures, limited construction activity in the river at any one time to reduce peak sediment loads, and scheduling certain construction activities to avoid periods of peak fish spawning activity (primarily in spring and early summer).

A two-phase fish stocking program was proposed by the Applicant to mitigate the reduction of fish populations and fish spawning and rearing areas. A put-and-take rainbow trout fishery was proposed for the second year after the reservoir is filled. A total of 20,000 catchable-size rainbow trout (about 10 to 11 inches in total length) would be released at four sites in the proposed reservoir and one site downstream of the proposed Wiley Dam over the period from early May to early August. Applicant estimated a minimum harvest of 10,000 fish, which assumes a harvest rate of at least 50 percent.

In addition, a put-and-grow rainbow and brown trout release program was proposed for the Wiley impoundment. During the first year after the reservoir is filled, 55,000 3-inch fingerlings of each of these species would be released at 4 sites in the reservoir. In this way, Applicant would attempt to establish a self-sustaining trout fishery.

In association with the stocking programs, Applicant proposed the placement of spawning gravel in 300 feet of the Malad River immediately upstream of the confluence of the Malad with the Wiley Pool. The stated objective would be to provide stocked and native fish an attractive spawning and nursery area, thereby establishing a naturally reproducing and self-sustaining trout fishery.

Applicant proposed to monitor the fishery to evaluate the success of the mitigative measures. Such studies would include a creel census, fish collections, and spawning surveys in the mouth of the Malad River, and would be used to determine the need and rates of future stocking.

4.1.5.3 Unavoidable Adverse Impacts

A reduction or displacement of fish, benthic invertebrates, and periphyton populations immediately downstream of the proposed project would be an unavoidable result of increased levels of suspended solids. These effects would be limited to the duration of the construction period. Similar impacts would also occur in the reservoir area during the initial period of project operation as newly inundated shoreline is exposed to wave action and water-level fluctuations.

Additional unavoidable adverse impacts would include: (1) the loss of white sturgeon rearing and potential spawning habitat; (2) the loss of spawning habitat for rainbow trout in the mainstem Snake River and mouths of tributaries and springs; (3) the loss of a large-river rainbow trout fishery; (4) the loss of some habitat and eight populations of Shoshone sculpin; (5) the loss of 8 miles of fast-flowing river and a resulting change in community structure from one suited to running water conditions to one with an affinity for slow-moving water conditions; and (6) some mortality associated with passage of fish through the turbines.

4.1.6 Terrestrial Environment

4.1.6.1 Beneficial and Adverse Impacts

Construction and operation of the proposed project would result in the maximum loss or alteration of 756 acres of vegetation. (See Table 4-1.) This includes 390 acres of vegetation lost by reservoir inundation, and an additional 366 acres of vegetation altered by borrow, spoil, and staging areas and transmission lines. This latter figure is the maximum area to be altered, because it includes all of the borrow and spoil areas that are above the high water mark (Table 4-2), and it will probably not be necessary to use all of the borrow and spoil areas. The final sites to be used have not yet been determined. These acreage values are based on figures filed with the FERC by the Applicant on September 11, 1981.

The wildlife species associated with the lost habitat would be displaced, and their survival would depend upon the capacity of adjacent habitat to support the increase in animal numbers. Noise from blasting may be channeled through the canyon, causing sensitive species such as nesting raptors to leave their nests temporarily or desert them permanently.

The most important impact would be the inundation of approximately 25 miles of riparian habitat along the 8 river miles of the Wiley Reach. The wetland and riparian habitat occur in two bands on either side of the Snake River and on four channel islands. Inundation and construction would

Table 4-1. Maximum number of acres, by vegetation types, to be disturbed by the proposed A.J. Wiley Project's construction and operation 1/.

Vegetation type	Preproject	Postproject			
	In project boundary	Inundated by reservoir	Borrow, spoil, and service areas above high water 2/	Transmission lines 3/	Total
Wetland	12	12	0	0	12
Herbaceous riparian	24	18	0	0	18
Woody riparian	167	86	5	0	91
Grass-shrub (Shadscale)	172	99	49	0	148
Grass-shrub (Sagebrush)	245	130	224	30	384
Agricultural	52	43	51	7	101
Talus-cliff	7	1	0	0	1
Disturbed/developed	8	1	0	0	1
Total	687	390	329	37	756

1/ Values based on figures filed by Applicant, September 11, 1981. Staff has rounded values to nearest acre. Include vegetation values--excludes 242 acres of open water to be inundated.

2/ Includes all borrow, spoil, and service areas not inundated by reservoir. Actual acreage impacted will probably be less depending upon which borrow and spoil areas are chosen.

3/ Represents Staff's best estimate of acreages of vegetation types. Assumes a 3-mile-long, 100-foot-wide ROW (right-of-way) transmission line. Applicant estimates permanent loss of 10 acres due to tower construction.

Table 4-2. Acres of vegetation types, on borrow, spoil, and service areas not inundated by the proposed project. 1/

Areas		Woody riparian	Shadscale	Sagebrush	Agriculture	Total
Borrow areas 2/ 3/						
	B_1	0	2	3	0	5
	B_2	0	14	0	19	33
	B_3	5	0	8	12	25
	B_4	0	0	9	10	11
	B_5	0	0	5	0	151
	B_6	0	11		0	19
	B_7	0	2	149	0	5
Subtotal		5	29	174	41	249
Spoil areas	S_1 3/	0	20	0	0	20
	S_3	0	0	50	0	50
Subtotal		0	20	50	0	70
Service areas 3/						
	SA_2	0	0	0	2	2
	SA_3	0	0	0	8	8
Subtotal		0	0	0	10	10
Total		5	49	224	51	329

1/ Based on figures from Applicant filed September 11, 1981. Staff has rounded figures to nearest acre.

2/ Figures represent Staff's estimate of the portion of B1 that will be above the reservoir.

3/ For location see Figure 2-8.

cause the loss of approximately 18 acres of herbaceous riparian vegetation, 91 acres of woody riparian vegetation, and 12 acres of wetland. This represents a loss of about 75 percent of the herbaceous riparian vegetation, 51 percent of the woody riparian vegetation, and 100 percent of the wetland vegetation within the project boundary. This is a significant loss because riparian and wetland vegetation represents only 0.6 percent of the vegetation in Idaho (Boccard, 1980).

Of particular concern is the loss of woody riparian habitat. The Wiley stretch of the Snake River contains well-developed groves of native birch and hackberry represented in only 0.1 percent of the vegetation of Idaho (Boccard, 1980). Development of agriculture and hydro projects upstream and downstream of the proposed project area has caused either the replacement of most of the native trees with nonnative species, or as in the case of Bliss Reservoir, has caused the loss of woody riparian vegetation altogether because the slopes are too steep to allow reestablishment (Idaho Power Company, 1981b, Application, Exhibit W). Most of the shoreline along the proposed Wiley Reservoir would be characterized by steep slopes that would preclude most natural revegetation of woody riparian vegetation (Idaho Power Company, 1981b, Application, Exhibit W.)

Although many wildlife species could potentially be impacted, directly or indirectly, by the loss of riparian and wetland habitat (Section 3.1.4.1), the greatest potential for substantial impact is to 56 species of birds, 12 species of mammals, and 7 species of herptiles (Idaho Power Company, 1981b, Application, Exhibit W). The impact to these organisms would be significant because the Wiley Reach is essentially an island of riparian vegetation within a 20-mile reach of developed river (Sections 3.1.4.1, 4.1.6.1, and Figure 4-3). After this habitat is inundated, there is little riparian habitat adjacent to the Wiley Reach available to wildlife. The potential for survival of displaced wildlife is therefore small.

The Applicant anticipates that the reservoir would fluctuate less than 1 foot during project operation and therefore would have minimal impacts on the success of nesting waterfowl.

4.1.6.2 Mitigative Measures Proposed

The Applicant proposes to implement a mitigative plan for the loss of wetland and riparian vegetation. No mitigation is proposed for the loss of sagebrush, shadscale, or agricultural vegetation types. Borrow, spoil, and staging areas above the reservoir would be graded, contoured, and replanted with grass.

The proposed riparian vegetation mitigative plan would establish nine areas of wetland, and woody and herbaceous riparian vegetation (Figures 4-4, 4-5, and 4-6). The goal of the plan is to develop 60 acres of wetland and herbaceous riparian habitat and 20 acres of woody riparian habitat. The Applicant proposed to grade the areas to reduce slope angles, and to construct submerged dikes in three areas to reduce flow velocities, prevent scouring, and increase sediment deposition. Marsh species (cat-tail, rushes, and sedges) would be planted in the shallow areas, with woody species (willow, cottonwood, and hackberry) being planted in a band along the shoreline. The Applicant has submitted a list of possible plant species that may be used in the mitigative plan (Appendix C).

The proposed wildlife mitigation would primarily benefit waterfowl. The Applicant's criteria for selection and development of wildlife mitigative areas were: (1) areas of highest wildlife potential, (2) largest possibility of success, and (3) greatest economic feasibility. The proposal includes nine mitigative sites dispersed over the length of the proposed reservoir. Numerous small islands would be constructed in some of the mitigative areas and approximately 24 goose-nesting platforms would be constructed on the islands (Figures 4-4, 4-5, and 4-6). In addition, approximately 50 Canada geese goslings would be stocked.

The transmission line would be designed to reduce the potential of accidental electrocution of raptors, and powerline structures would have nesting and roosting structures.

4.1.6.3 Unavoidable Adverse Impacts

Although the Applicant has proposed a riparian vegetation mitigative plan, approximately 91 acres of woody riparian habitat, 18 acres of herbaceous riparian habitat, 12 acres of wetland habitat, 200 acres of grass-shrub habitat, and the associated wildlife species and their productivity would still be unavoidably lost. These values were calculated by assuming that all wetland and riparian habitat disturbed or inundated is lost, and all inundated grass-shrub habitat is lost. In addition, the increase in human activities and noise levels associated with project construction would result in the unavoidable disturbance of resident wildlife inhabiting areas adjacent to construction sites.

4.1.7 Threatened or Endangered Species

4.1.7.1 Beneficial and Adverse Impacts

The bald eagle has been identified by the FWS as the only Federally listed endangered or threatened species occurring within the area of the proposed A.J. Wiley Project. In Staff's opinion, the construction of the proposed project would have no effect on the regional bald eagle population.

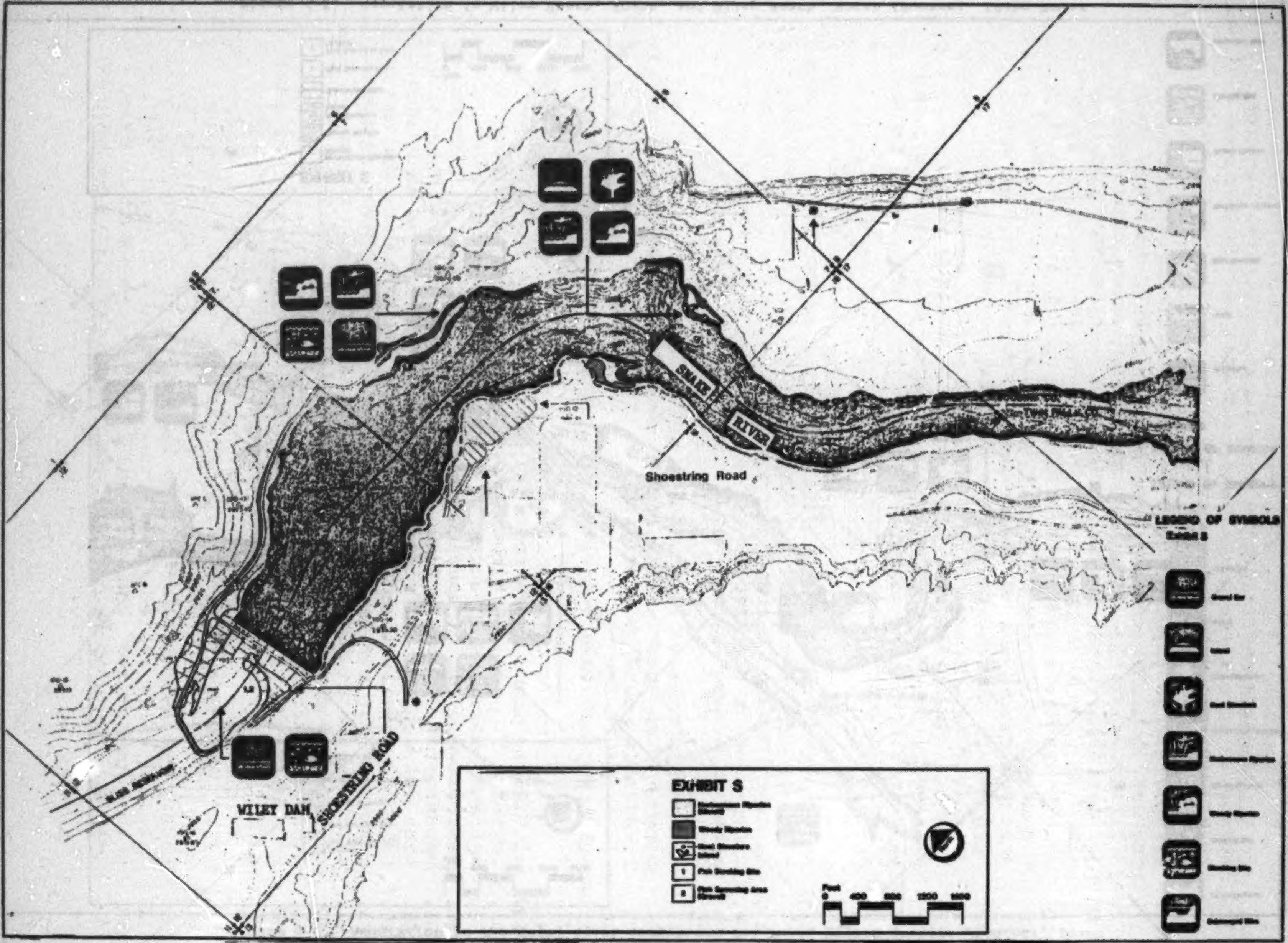
SNAKE
RIVER
Shoestring Road
SHOESTRING ROAD
WILEY DAM
LEGEND OF SYMBOLS
Exhibit S
EXHIBIT S
Feet
0
400
800
1200
1600

Figure 4-4. Vegetation in the Wiley Dam and Shoestring Road area (Source: Idaho Power Company, Application, 1981b, Exhibit S).

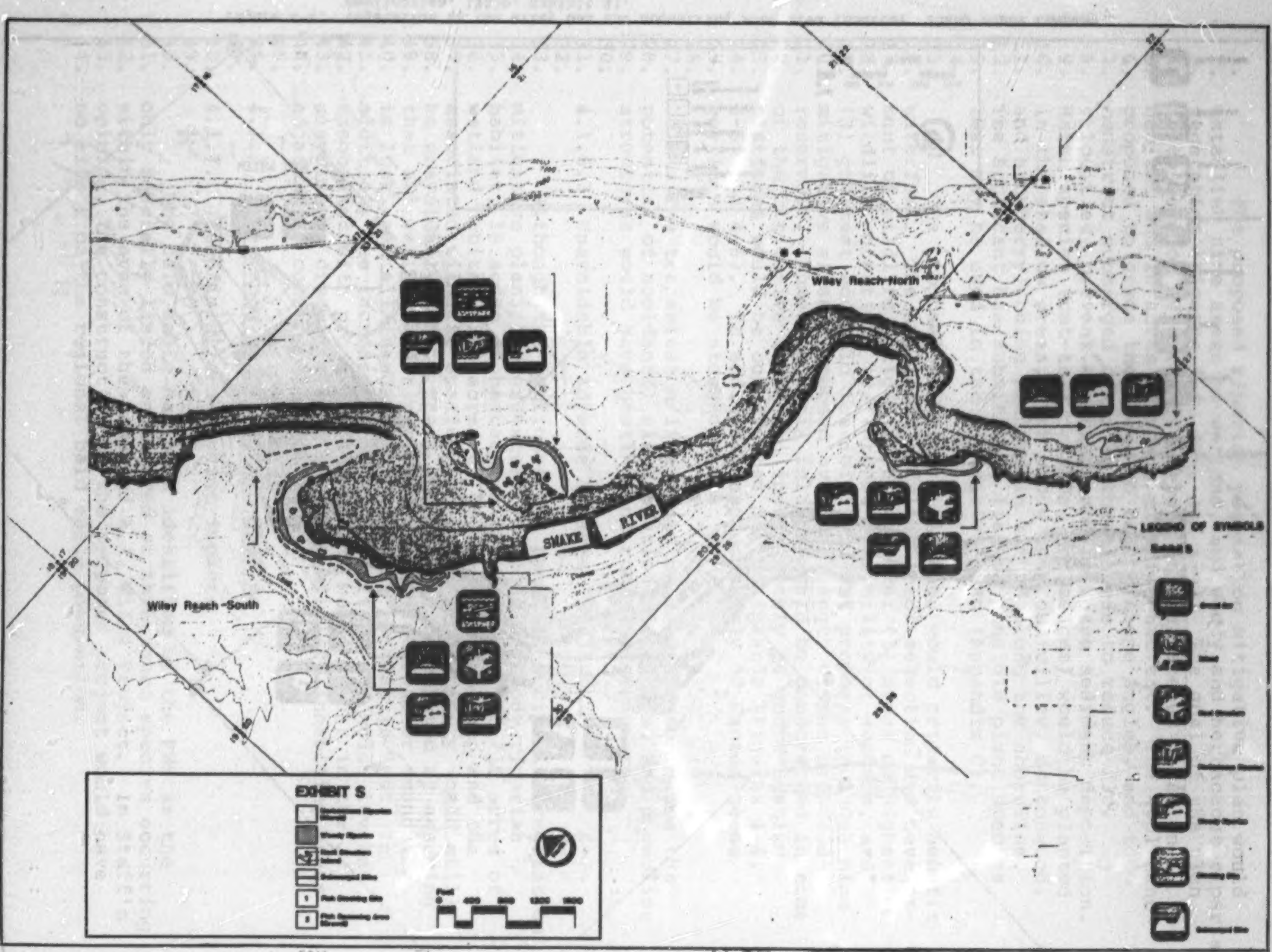
Wiley Reach-North
Wiley Reach-South
SNAKE
RIVER
LEGEND OF SYMBOLS
EXHIBIT S
Feet
0
400
800
1200
1600

Figure 4-5. Vegetation in Wiley Reach, South, and Wiley Reach, North (Source: Idaho Power Company, 1981b, Application, Exhibit S).

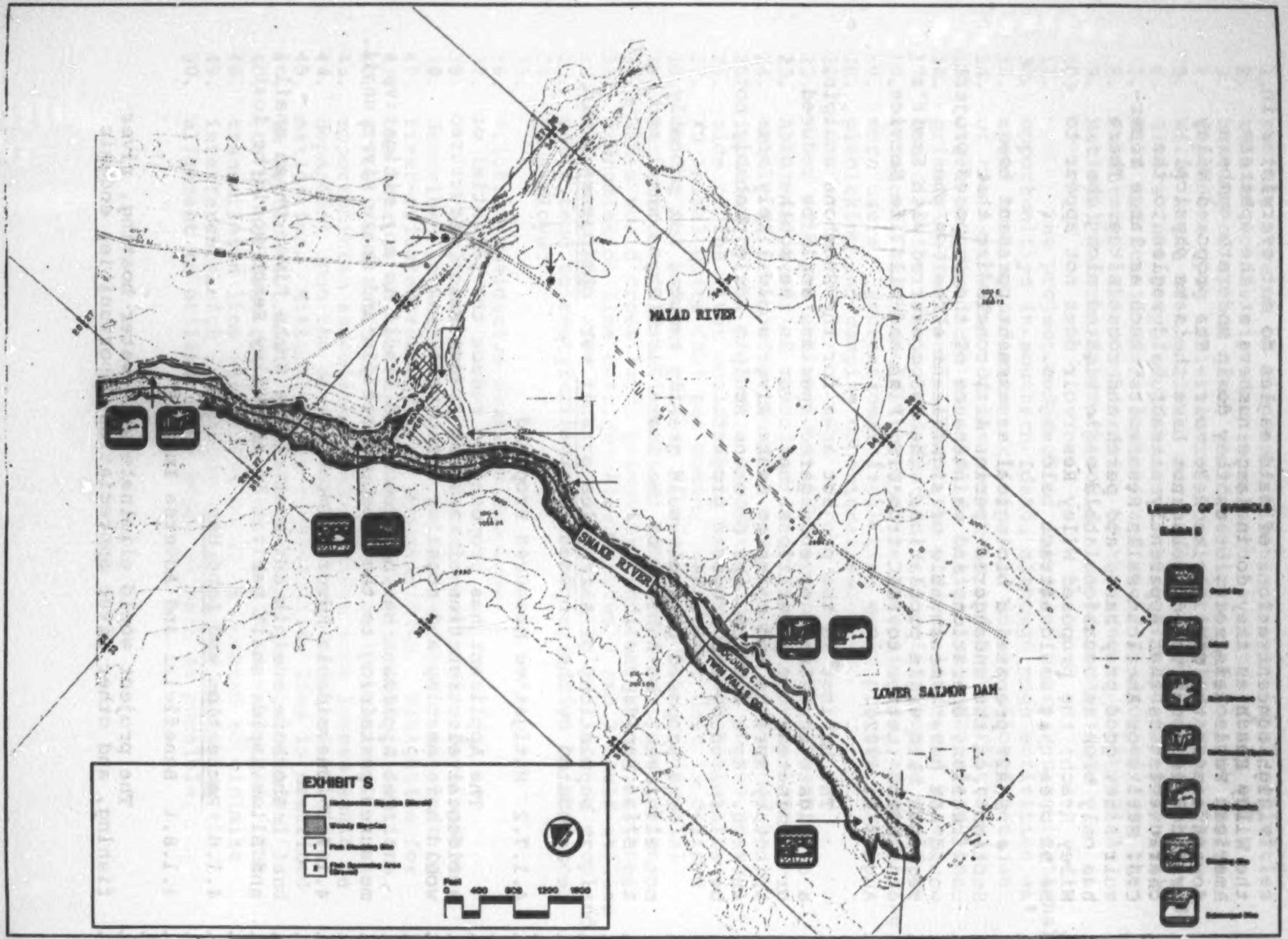
MALAD RIVER
SNAKE RIVER
TWIN FALLS
LOWER SALMON DAM
EXHIBIT S
Woody Riparian
Fish Spawning Area
Feet
0
400
800
1200
1600
LEGEND OF SYMBOLS

Figure 4-6. Vegetation in the Malad River confluence and Lower Salmon damsite (Source: Idaho Power Company, 1981b, Application, Exhibit S).

High concentrations of bald eagles do not overwinter in the Wiley Reach as they do in large numbers at the upstream American Falls Reservoir, or as they do in moderate numbers downstream at the C.J. Strike Reservoir. The proposed Wiley Project, if constructed, would not have the same physical characteristics that apparently attract bald eagles to the C.J. Strike or American Falls Reservoirs, such as large reservoir size, good prey base, and perch and roost sites. There has only been an occasional bald eagle sighted along the Wiley Reach; the proposed Wiley Reservoir does not appear to be an area that would attract bald eagles.

Staff prepared a biological assessment pursuant to Section 7 of the Endangered Species Act, concluding that construction, operation, and maintenance of the proposed project would not have a measurable or significant effect on the regional bald eagle population. The FWS concurred with Staff's conclusion (Letter to FERC from U.S. Fish and Wildlife Service, August 1, 1982).

The habitat in the project area for the Shoshone sculpin, a candidate threatened or endangered species, would be reduced or eliminated; the populations that occur in the mouths of tributary springs and mainstem Snake River would likely not survive. As a species, the Shoshone sculpin would probably not be eliminated by the proposed project.

The proposed project would greatly reduce, but probably not eliminate, the habitat of the Snake River Physa snail and the Bliss Rapids snail.

Populations of Astragalus purshii var. ophiogenes would be inundated by the proposed reservoir.

4.1.7.2 Mitigative Measures Proposed

The Applicant has proposed to reduce the potential of accidental electrocution of raptors; transmission structures would have nesting and roosting structures.

The Applicant has not committed itself to any mitigative measures pertaining to the Shoshone sculpin and Snake River snail.

4.1.7.3 Unavoidable Adverse Impacts

Shoshone sculpin and most of the Snake River Physa snail and Bliss Rapids snail habitat in the Wiley Reach would be lost.

4.1.8 Recreation and Land Use

4.1.8.1 Beneficial and Adverse Impacts

The project would eliminate whitewater boating, river fishing, and other river appreciation opportunities endemic to this stretch of the Snake River. Recreational activities related to the riparian zone, such as nature study and hunting of upland game, would be diminished to some degree dependent upon the extent of loss of riparian area. The Wiley Reach of the river, currently included on the Nationwide Rivers Inventory, would cease to be evaluated for potential Wild and Scenic River status, and would be dropped from the Inventory. The consideration of the area as a potential National Natural Landmark would also be terminated.

The project would offer increased flatwater recreational opportunities in southern Idaho, although such activities as speed boating and water skiing would not be allowed because of the narrowness of the reservoir and the conflicts with other programs such as wildlife mitigation. Therefore, the primary recreational uses of the project lands and waters would be for fishing and hunting. Shoreline access would be enhanced, which would increase the potential for accommodating more users. Recreational facilities would provide formal picnicking and camping opportunities.

The project would utilize approximately 800 acres. About 450 acres of this land is privately owned. Approximately 77 acres of productive agricultural land would be impacted by the project. Inundation of lands on the south side of the river would result in the loss of grazing for 50 Animal Units (AU) per month. (An Animal Unit is defined as one cow and one calf or five sheep.) Four residential structures would be inundated. The proposed transmission lines would cross lands primarily used for grazing, although transmission line corridor Alternatives 2 and 3 would utilize some cropland. The location of transmission lines on cropland would tend to restrict the choice of irrigation methods to be employed.

4.1.8.2 Mitigative Measures Proposed

Applicant has proposed the recreational development described in Section 2.1.2.5 as mitigation for the loss of river-oriented recreational opportunities. Mitigation for the impacts on the riparian zone are described in Sections 4.1.5.2 and 4.1.6.2. The mitigation of recreational opportunities associated with riparian zone losses would be dependent upon the success of the vegetation and wildlife mitigation. Mitigation for river fishing loss is described in Section 4.1.5.2. About 46 acres of the agricultural land (to be utilized for borrow sites) would be reclaimed. The transmission line structures would be located to minimize interference with irrigation operations by adjusting the alignment to utilize field edges as much as possible.

4.1.8.3 Unavoidable Adverse Impacts

River-oriented recreational activities would be eliminated. Riparian zone recreational opportunities would be diminished. Approximately 800 acres of land would be lost for present uses, including 31 acres of agricultural land, 4 residences, and the equivalent of 50 Animal Units per month of grazing land. Further consideration of the area for potential National Natural Landmark status would be halted, and the Wiley Reach, currently included on the Nationwide Rivers Inventory, would cease to qualify for such listing.

4.1.9 Visual Resources

4.1.9.1 Beneficial and Adverse Impacts

Construction

During construction, landscape characteristics of the area surrounding the damsite would change significantly, and the area of impoundment upstream would change to a lesser degree. In each case the degree of impact would vary toward either significant or minor, depending on visibility. Generally, this impact would be temporary for the duration of construction activities.

Within a larger area that surrounds the proposed damsite, the presence in number and type of construction-related equipment would alter what is a quiet, natural, somewhat rural landscape to one of intensely noisy and dirty activity. The generally undeveloped, enclosed, and modestly vegetated topography within the Snake River Canyon would progress into an area involving the mobilization of personnel, material, and equipment; relocation of a road; development of spoil and borrow areas; construction of a cofferdam, dam, and power-related facilities; and assorted other excavation activities. A maximum of approximately 21 acres would be impacted in this area during construction.

Construction activities in the vicinity of the reservoir would be limited to a narrow fringe area adjacent to the normal Snake River channel for a distance of about 8 miles on each side of the river. Transmission line construction would be limited to the small areas at the base of the 25 tower sites needed to tie the proposed project into the Applicant's existing grid.

The construction of project facilities would not significantly affect the views of motorists, with the exception of those few who travel the portion of Shoestring Road where it crosses the Snake River.

Operation and Maintenance

Direct impacts from operation and maintenance of the proposed project would be confined primarily to Shoestring Road near the dam, around the dam structure itself, and on the river or its banks upstream and downstream of the dam. From the water surface and its banks downstream of the dam, and from the new loop of Shoestring Road where it is below the rim of the river canyon, the dam and appurtenant facilities would contrast with the surrounding landscape. From the reservoir and its banks upstream of the dam, and from the new portion of Shoestring Road along the right bank of the reservoir, the dam would be visible as a relatively insignificant, low, retaining structure of limited contrast. The signs of the spoil, borrow, and service areas utilized during construction would become less obvious as time goes on. Their impacts would be minor, however, because of their distant location from a large number of viewers.

Transmission structures would be visible from this area, especially as they ascend from the powerhouse out of the inner canyon, across the southern portion of Shoestring Road, and up the outer canyon wall. This impact would be relatively significant compared to others.

Formation of the proposed reservoir would eliminate 8 miles of moving water, including eight rapids and most of the riparian vegetation. The moving water, the white-water rapids, and the riparian vegetation are all important parts of the great visual variety in the landscape of the inner canyon. Riparian vegetation would reestablish itself, but not to the degree that presently exists. The moving water with intermittent rapids would be replaced with a long thin ribbon of relatively still water. The resulting landscape variety, although diminished in numbers, would not constitute a significant negative visual impact; rather, it would highlight a significant change in the landscape. This change would be evident primarily to those who have previously seen and enjoyed this portion of the Snake River. Others might not view what they had expected to view, and still others might not be aware of any change at all.

4.1.9.2 Mitigative Measures Proposed

The Applicant intends to apply construction methods commonly used to minimize adverse impacts to visual resources. These methods would include: (1) strict limits on the types and extent of grading and other excavation practices; (2) minimizing the amount and type of vegetation cleared and the amount of time during which construction areas remain unvegetated; (3) use of appropriate erosion control and sedimentation collection measures; and (4) other measures deemed necessary to preserve the visual quality of the area as much as possible during borrowing, spoiling, and constructing project works and construction facilities.

Mitigating the visual impact of project features would be achieved, to the greatest extent possible, by applying the appropriate design principles aimed at clarity in appearance, organization, and simplicity. Appurtenant facilities such as lights, fencing, barriers, and other minor features would be integrated or concealed to the greatest extent possible. The Applicant believes that if appropriate mitigative measures are taken during construction, the measures would contribute significantly to the preservation and enhancement of visual quality during operation. The Applicant submits that in all locations, attention to the detailed design and location of the transmission line structures and to simplicity and consistency of design along the entire line would somewhat mitigate adverse visual impacts. The Applicant would not provide native tree and shrub planting at the base of the tower structures located between the dam and base of the main canyon wall for screening views of the towers from Shoestring Road, as the towers in this area would be susceptible to range fires. Any added vegetation would reduce the reliability of the line. The proposed alignment over the outer canyon rim skyline, south of the damsite, would avoid topographic high points on the rim that would fractionally reduce the potential impact.

The new segment of Shoestring Road would receive treatment similar to that planned for other major project work; particular attention would be paid to the detailed design features of the bridge and road bed. Where conditions permit, additional native tree and shrub plantings would be provided to screen the road from reservoir recreationists and to integrate the road as much as possible into the landscape. Mitigating the loss of whitewater in this portion of the river is not considered practicable by the Applicant. The Applicant would use planting programs to speed the growth of new riparian vegetation, in an attempt to mitigate some part of the visual impact that remains from the loss of the existing vegetation.

Further information, including more detail on the mitigative measures proposed by the Applicant for construction, operation, and maintenance, can be found in Exhibits V and W of the application for license (Idaho Power Company, 1981b).

4.1.9.3 Unavoidable Adverse Impacts

Construction

Construction activities involving different types of equipment, materials, and operations would have varying visual impacts. These impacts vary in relation to the size of the construction area involved, the numbers and types of equipment being used, the time (including time of day, day of the week, and month of any construction year), and the area's relative accessibility to the viewing public. Most construction sites are not overly accessible to a great number of viewers, and therefore, the direct impact is moderate. Otherwise, the orderly visual quality that now exists would be unavoidably impacted during the construction activities; these effects would generally be short-term.

Operation and Maintenance

Unavoidable adverse impacts associated with the operation and maintenance of the proposed project rest generally on the premise that man-made structures would be placed in the landscape that otherwise would not occur. These structures would cause minor, unavoidable adverse impacts to the existing visual quality because of their location, distant from larger concentrations of views and viewers. Although the extensive cuts that provide a roadway for Shoestring Road would be readily visible at close range, as would the abandoned section of the road, the impact would be minor because the ability of a viewer to use the facility tends to significantly reduce any adverse reaction to the facility.

A significant unavoidable change in the existing landscape character would be caused by the replacement of 8 miles of obvious moving water (including eight rapids) with a reservoir of equal length. Depending on personal preference, creation of a reservoir environment would displease some individuals, while enhancing the area for others; consequently, this type of impact is embodied in, and referred to as change. How it would affect individuals, in a quantitative or qualitative sense, cannot be predicted. Any evaluation of the change now would be subjective; only through the test of time would an objective evaluation be possible.

4.1.10 Cultural Resources

4.1.10.1 Beneficial and Adverse Impacts

Seven prehistoric and historic sites (10GG1, 10GG170, 10GG188, 10TF352, 10TF355, 10TF356, 10TF458) in the cultural resources inventory (Table 3-7) would be totally, or nearly totally, inundated by the proposed Wiley Reservoir. One additional site (10TF457) would be partially inundated.

Three sites (10TF171, 10TF349, 10TF350), and possibly a fourth (10TF351), would be wholly or partially destroyed by activities associated with the wildlife and riparian vegetation mitigative work along the shores of the proposed reservoir. The portions of these sites that would not be destroyed would be inundated by the reservoir.

Two sites (10GG189, 10TF456) are located within areas designated as alternate spoil and borrow areas, respectively, and could be wholly or partially destroyed or disturbed by the use of these locations.

Proposed recreational developments along the reservoir shoreline would destroy one site (10GG169), and probably destroy or otherwise disturb a second property (10GG168).

One site (10TF455) lies along the proposed alternative transmission corridor no. 1, and could be adversely impacted by the construction of transmission towers and the construction and use of access roads, staging areas, and other such areas, if this corridor is selected for construction. The exact locations of towers, access roads, and staging areas have not been determined, and the nature of impacts to these sites are therefore unknown.

Two sites (10TF353, 10TF354) in the cultural resources inventory would not be impacted by the proposed project.

4.1.10.2 Mitigative Measures Proposed

The Applicant has proposed data-recovery measures to mitigate adverse impacts to two sites (10GG1, 10TF352) determined eligible for the National Register of Historic Places, and one site (10GG188) that appears eligible. A detailed program of salvage excavation would be undertaken to record the significant information present at sites 10GG1 and 10TF352. Technical drawings of the pump house and internal pumping equipment would be prepared by an architectural historian to record the significant data at site 10GG188 (Ostrogorsky, 1981; Plew 1981).

No mitigative measures have been proposed for sites 10GG189 and 10TF455, where eligibility for the National Register has not been established.

4.1.10.3 Unavoidable Adverse Impacts

Fourteen prehistoric and historic sites would be unavoidably impacted by the creation of Wiley Reservoir and by wildlife-riparian vegetation mitigation and recreational development along its shoreline. Three additional sites could be impacted at spoil and borrow areas by construction and maintenance activities along the transmission corridor, depending upon the location of these areas and activities. Two sites (10GG1 and 10TF352), and possibly two others (10GG189 and 10TF455), would be partially destroyed by the implementation of salvage excavation programs to recover the significant information present at these sites.

4.1.11 Socioeconomic Factors

4.1.11.1 Beneficial and Adverse Impacts

The project is expected to take 28 months to build and would generate an on-site labor force averaging 202 workers per month. Peak employment of 322 workers would occur during the second year of construction (April to December average). Applicant estimates that 258 workers would commute to the job site from their residences within the six-county area, predominantly from Twin Falls County. Thus, an estimated 64 workers would be in-migrants, with 32 workers bringing their families (average 3 per family), resulting in a population increase of 128. If, as the Applicant suggests, this number of workers relocates in Twin Falls, public services would not be significantly impacted; however, the availability of housing that is already scarce would be negatively impacted. If this number of workers should locate closer to the project in Bliss or Hagerman, there could be problems in providing public services (police, firemen, schools).

Employment opportunities during the construction period could be beneficial to local construction workers, especially if the high level of unemployment presently existing in the construction industry continues. Project operation would be by remote control from the existing Bliss powerplant and would require only one or two additional workers. Beneficial aspects of the project, in addition to increased employment opportunities, would be a gain in electrical power, if the electricity is economically priced.

Adverse impacts would include the loss of the 8-mile reach of the free-flowing Snake River that provides local employment and revenue through tourist attractions, such as the Snake River Pottery, Inc., and the Snake River Expeditions, a commercial rafting service. In addition, four houses and three small hydro projects, several trout ponds, a fuel alcohol plant, a gravel operation, and several other small developments along the river would also be inundated.

In most cases, the high costs of homes and prevailing interest rates would adversely affect the individuals who were forced to relocate. The income realized from the operation of the trout ponds, a fuel alcohol plant, a gravel operation, a commercial pottery, a rafting service, and the agricultural lands that would be inundated by the reservoir, may all be lost for the life of the project. This reduction in income may also result in lower Federal and state tax revenues. In addition, the higher water levels caused by the proposed reservoir would limit the developable head of other hydroelectric sites. (See Section 1.3.2.3.) Thus the revenue or cost savings that could be realized from developing these sites would be reduced.

The costs of displacement from one's house involves a combination of financial and emotional factors. The former may include: (1) direct expenditures and foregone earnings associated with locating replacement housing; (2) the necessity to spend a greater amount for housing than the fair market value of the displaced dwelling unit; (3) moving expenditures, including packing and unpacking; (4) expenditures for lodging, meals, and transportation resulting from temporary dislocation; (5) closing costs associated with the purchase of replacement housing, including title search, recording fees, and taxes; (6) increased monthly mortgage payments caused by the necessity to obtain a new mortgage at a higher rate of interest; and (7) increased real property tax payments.

Although emotional factors related to displacement cannot be stated in dollar terms, they, nevertheless, may be significant. For example: a person owning a house that centers on appreciation of a natural setting may be unable to locate suitable replacement housing; and a family that has resided in a small, closely-knit community for many years may not wish to move from it.

Residents of the six-county area who use the Wiley Reach of the Snake River for whitewater boating or other activities associated with the free-flowing nature of the river would incur additional expenses when traveling to areas that have similar characteristics, the nearest of which is the Salmon River near Stanley. For example, residents in the city of Twin Falls are only about 40 miles from the project area, and would incur travel expenses of $16.00 per round trip, assuming $0.20 per mile for automobile expenses. These same residents would have to travel about 140 miles to reach Stanley, and would incur a total travel cost of $56.00 per round trip. 1/ The additional time required to reach the Salmon River may reduce the time of the planned activities at that site. Thus, residents not only would incur additional expenses, but may also have to curtail their activities at the Salmon River and allocate more time to travel.

1/ Assuming the trip originates from Twin Falls, Idaho.

The principal benefit from the project is hydroelectric power. In the public scoping meeting held in Gooding, Idaho, on July 28, 1981, several speakers addressed what they believed was a correlation between employment layoffs at FMC and Monsanto Corporations and the shortage of electric power. Staff's subsequent investigation showed that the FMC Corporation laid off approximately 40 to 50 people in July and August of 1979, and no one in 1980 or 1981 (Benji Lawrence of FMC Corporation to David Johnson of FERC staff, August 17, 1981, personal communication). Monsanto Corporation, a Utah Power and Light Company customer, had no layoffs due to lack of power (Monsanto Corporation to David Johnson of FERC staff, August 17, 1981, personal communication).

To the extent that layoffs at FMC Corporation are correlated with the availability of energy during the peak load period, the layoffs would be more likely to occur when adverse streamflow conditions reduce the ability of the Applicant's hydro plants to meet electrical demand.

4.1.11.2 Mitigative Measures Proposed

In exercising the power of eminent domain under state law, or Section 21 of the Federal Power Act, the Applicant would be required to pay all property owners the fair market value of the property inundated by the proposed project. The trout ponds, developed hydro sites, a fuel-alcohol plant, and any other developments along the river adversely impacted by the project would have to be compensated for by the Applicant.

4.1.11.3 Unavoidable Adverse Impacts

The proposed project reservoir would inundate land now occupied by four homes, three small hydro plants, trout ponds, a fuel-alcohol plant, a gravel operation, and Snake River Pottery, Inc. In addition, Snake River Expeditions, Inc. would be precluded from continuing in business because licenses to operate are site specific. Area residents whose property would be flooded by the proposed reservoir would be forced to relocate their homes and businesses. If construction workers choose to relocate in Bliss or Hagerman, the ability to provide the existing quality of police and fire protection, housing, and schools for children may be impaired during the construction period.

Those recreationists who currently use the Wiley Reach because of its free-flowing characteristics would have to travel an additional 280 miles roundtrip to experience similar conditions on the Salmon River. The travel expenses associated with such activities would increase.

4.2 BLISS BRIDGE DAMSITE--ALTERNATIVE 1

Staff is assuming that the impacts, mitigative measures, and unavoidable adverse impacts of Alternative 1 are very similar to those described in Section 4.1 for the A.J. Wiley Project. Therefore, rather than repeat the latter, this section stresses differences in terms of impacts, mitigative measures, and unavoidable adverse impacts. The reader should assume that the mitigative measures proposed may be tentative at this time because the information needed to formulate more definitive plans is not available; nor has the Applicant committed itself to any mitigative proposals for this alternative.

4.2.1 Geology and Soils

4.2.1.1 Beneficial and Adverse Impacts

Erosion impacts during construction and operation would be the same as for the proposed project, although a greater potential for project-induced sliding would occur at the damsite itself. The right abutment of the proposed dam would impinge upon a portion of the toe of the Bliss landslide, and the construction of the intake and approach channel on the left abutment would involve excavation of part of a small landslide area.

Seepage could occur through permeable materials beneath the dam and would require consideration of problems similar to those anticipated at the proposed A.J. Wiley damsite, such as piping beneath structures, uplift pressures, and wetting and weakening of highly weathered foundation materials. Investigations completed by the Applicant in September 1981 show that the location of the ancestral Snake River channel is almost directly below the present river at the Bliss Bridge damsite (International Engineering Company, 1981b; 1981c; 1981d). Thus, potential problems associated with seepage would probably be confined mostly to the immediate vicinity of the dam.

4.2.1.2 Mitigative Measures Proposed

General measures proposed for mitigation of erosion impacts at the proposed project (Section 4.1.3.2) would presumably apply for a project utilizing the Bliss Bridge damsite.

No formal proposals have been made for landslide mitigation. As part of the preliminary assessment of the Bliss Bridge site, however, Applicant has suggested the possibility of stabilizing the toe of the Bliss landslide by construction of large retaining walls, diversion of water courses at the head of the slide area away from the threatened area, interception of flows from springs within the slide area for discharge outside the slide, filling and leveling fissures and depressions in the slide area to aid runoff of surface water, and using horizontal drains drilled into water-bearing beds underlying the unstable lacustrine clay to lower the naturally high internal water pressure (International Engineering Company, 1981a; 1981b). The major portion of the small landslides in the intake and approach channel area would probably be removed by the normal excavation necessary for the construction of project features in that area. Applicant suggests that over-excavation to remove the remaining small portion of potentially unstable material could easily be accomplished at the same time.

The Applicant's suggested remedial measures for weatherable Older Alluvium and Upper Banbury Basalt include placing concrete structures and embankment materials on freshly exposed, weatherable surfaces or spraying a protective cover of asphalt on freshly exposed weatherable surfaces (International Engineering Company, 1981b).

4.2.1.3 Unavoidable Adverse Impacts

Minor erosion during construction, and bank erosion and sloughing along the reservoir shoreline, would be generally the same as for the proposed A.J. Wiley Project (Section 4.1.3.3).

4.2.2. Vegetation and Wildlife

4.2.2.1 Beneficial and Adverse Impacts

Construction and operation of the Bliss Bridge alternative would impact approximately 697 acres of vegetation (Table 4-3). This would include 285 acres inundated by the reservoir (105 acres less than the proposed A.J. Wiley damsite), and 412 acres utilized for borrow, spoil, and service areas and transmission lines (46 acres more than the proposed damsite) above the high-water mark. The acreages impacted by the borrow, spoil, and service areas are shown in Table 4-4. The most significant vegetation loss would be 10 acres of wetland, 9 acres of herbaceous riparian, and 87 acres of woody riparian vegetation. The acreage values assume that the same borrow, spoil, and service areas proposed for the A.J. Wiley damsite would be used, and that the transmission line would still be 3 miles long.

Table 4-3. Maximum number of acres, by habitat type, that would be disturbed by construction and operation of the Bliss Bridge alternative. 1/

Habitat type	Inundated by reservoir	Borrow, spoil, and service areas above high water 2/	Transmission lines 3/	Total
Wetland	0	10	0	10
Herbaceous riparian	2	7	0	9
Woody riparian	71	16	0	87
Grass-shrub (shadscale)	63	53	0	116
Grass-shrub (sagebrush)	105	238	30	373
Agricultural	42	51	7	100
Talus-cliff	1	0	0	1
Disturbed-developed	1	0	0	1
Total	285	375	37	697

1/ Values based on figures filed by Applicant September 11, 1981, and Staff's estimation of acreage differences between the damsites determined from Applicant's vegetation map. Includes only vegetation values—excludes 206 acres of open water to be inundated. Staff rounded values to nearest acre.

2/ Includes all borrow, spoil, and service areas not inundated by reservoir. Actual acreage impacted will probably be less depending upon which borrow and spoil areas are chosen.

3/ Values used here are the same as for the Wiley damsite. The transmission line may need to be longer for this alternative site.

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Table 4-4. Acres of habitat types on borrow, spoil, and service areas that would not be inundated by the reservoir of the Bliss Bridge alternative. 1/

Areas		Wetland	Herbaceous riparian	Woody riparian	Shadscale	Sagebrush	Agriculture	Total
Borrow areas								
	B_1 2/	2	1	2	2	3	0	10
	B_2	0	0	0	14	0	19	33
	B_3	0	0	5	0	8	12	25
	B_4	0	0	0	0	9	10	19
	B_5	0	0	0	0	5	0	5
	B_6	0	0	0	11	0	0	11
	B_7	0	0	0	2	149	0	151
Subtotal		2	1	7	29	174	41	254
Spoil areas 2/								
	S_1	0	0	0	20	0	0	20
	S_2 (left)	0	0	7	0	10	0	17
	S_2 (right)	8	6	2	1	4	0	21
	S_3	0	0	0	0	50	0	50
Subtotal		8	6	9	21	64	0	108
Service areas								
	SA_1 2/	0	0	0	3	0	0	3
	SA_2	0	0	0	0	0	2	2
	SA_3	0	0	0	0	0	8	8
Subtotal		0	0	0	3	0	10	13
Total		10	7	16	53	238	51	375

1/ Values based on figures filed by Applicant September 11, 1981. Staff has rounded figures to the nearest acre.

2/ For location see Figure 2-8.

Construction of the Bliss Bridge alternative would not require inundating service area 1, spoil area 2, nor one-half of borrow area 1, as would the Applicant's proposal. If service area 1, spoil area 2 right, and one-half of borrow area 1 (Figure 2-6) are relocated to the Bliss Bridge damsite and if Shoestring Road is relocated, it would preserve 10 acres of wetland, 7 acres of herbaceous riparian, 11 acres of woody riparian, 4 acres of shadscale, and 14 acres of sagebrush vegetation. In addition, a BLM wildlife management area located along the north bank would not be impacted, and the 6.7-acre channel island that has good riparian cover and nesting geese would not be inundated (Figure 4-7).

4.2.2.2 Mitigative Measures Proposed

The vegetation and wildlife mitigative plan may be the same as for the proposed damsite, except that the mitigative area near the Bliss Bridge would be smaller or would be eliminated.

4.2.2.3 Unavoidable Adverse Impacts

The loss of approximately 87 acres of woody riparian, 9 acres of herbaceous riparian, 10 acres of wetland, and 168 acres of grass-shrub habitat and the associated wildlife species and their productivity would be unavoidable. These values were calculated assuming all disturbed and inundated riparian and wetland habitat is lost and all inundated grass shrub habitat is lost. In addition, the increase in human activities and noise levels associated with project construction would unavoidably disturb the resident wildlife living in areas adjacent to construction sites.

4.2.3 Cultural Resources

4.2.3.1 Beneficial and Adverse Impacts

The Bliss Bridge alternative would have the same impact on sites in the cultural resources inventory as the proposed A.J. Wiley Project, with the exception of sites 10GG1 and 10TF352. Site 10GG1 would be downstream of the alternative damsite, and would not be inundated. The site, however, would be in close proximity to the alternative damsite, and could potentially be adversely impacted by staging areas and other activities associated with dam construction and operation. The site could also potentially be adversely impacted by construction activities associated with the relocation of Shoestring Road downstream from Bliss Bridge. Site 10TF352 would be destroyed by construction of the alternative damsite.

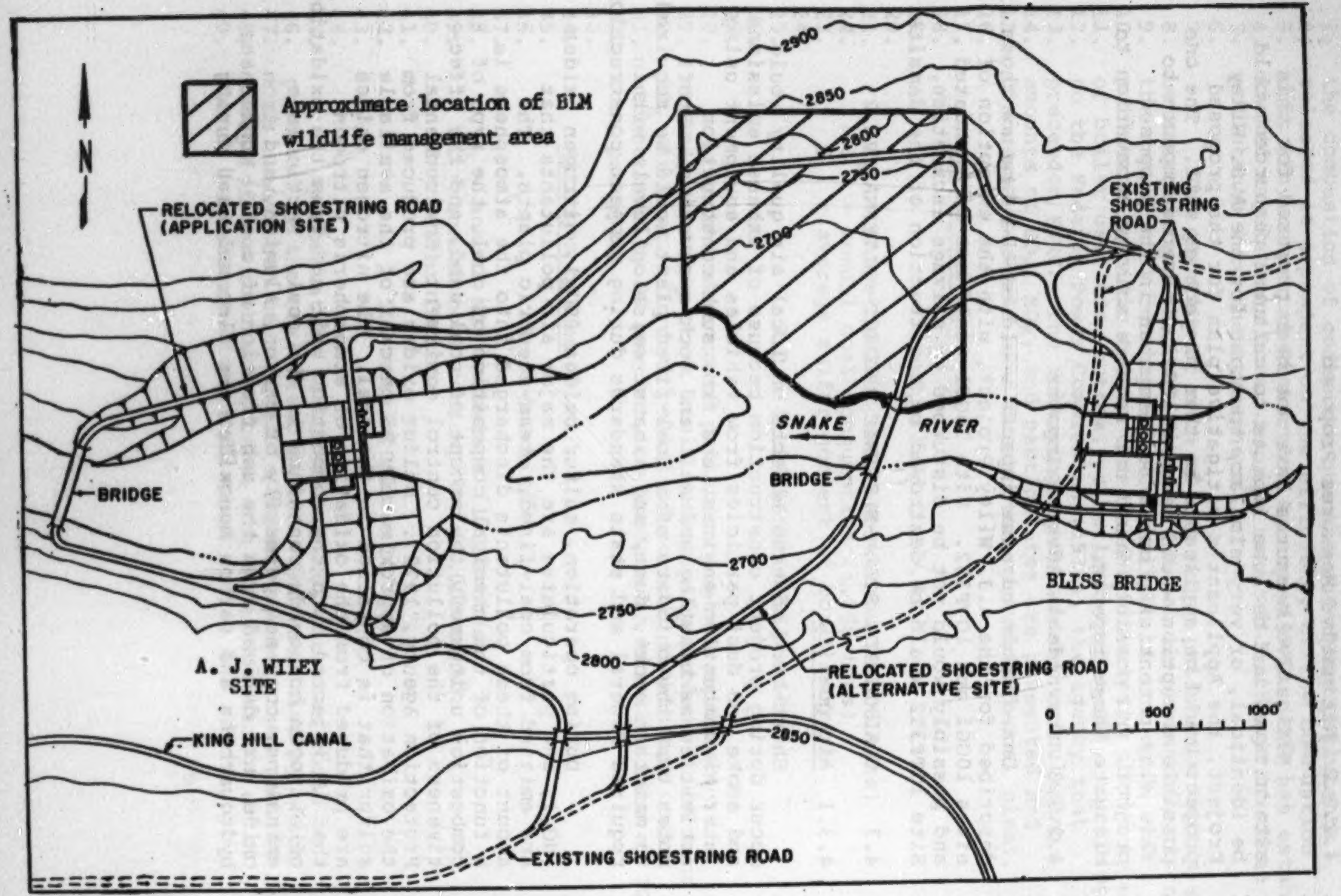
N
▨ Approximate location of BLM wildlife management area
RELOCATED SHOESTRING ROAD (APPLICATION SITE)
BRIDGE
A. J. WILEY SITE
KING HILL CANAL
EXISTING SHOESTRING ROAD
2900
2850
2800
2750
2700
SNAKE
RIVER
BRIDGE
RELOCATED SHOESTRING ROAD (ALTERNATIVE SITE)
EXISTING SHOESTRING ROAD
BLISS BRIDGE
2700
2750
2800
2850
0
500'
1000'

Figure 4-7. Location of Bliss Bridge alternative and BLM wildlife management area (Source: Idaho Power Company, 1981f).

4.2.3.2 Mitigative Measures Proposed

Mitigative measures have not been proposed for this alternative; but because impacts to cultural resources would be identical, or very similar, to those for the A.J. Wiley Project, the Applicant's mitigative plan for the proposed project would be applicable to this project as well. The one possible exception would be site 10GG1. Adverse impacts to this site potentially could be less than in the proposed project, and possibly would not require salvage excavation to mitigate these impacts.

4.2.3.3 Unavoidable Adverse Impacts

Unavoidable adverse impacts would be the same as those described for the A.J. Wiley Project, with the exception of sites 10GG1 and 10TF352. Site 10GG1 would not be inundated and possibly would not be disturbed by salvage excavation. Site 10TF352 would be destroyed by construction of the damsite.

4.3 COAL-FIRED, STEAM-ELECTRIC PROJECT--ALTERNATIVE 2

4.3.1 Air Quality

Short-term adverse effects on local air quality would occur during project construction because of exhaust emissions and smoke and dust particles from vehicles and equipment using internal combustion engines, and from such construction activities as blasting and soil and rock excavation. Staff notes that the builders of a coal-fired plant would be required to maintain smoke, dust, and exhaust emission levels within required Federal and state standards during project construction.

During operation, sulfur oxides (SO_x), nitrogen oxides (NO_x), and particulates are the major air pollutants that are emitted from coal-fired, steam-electric plants. The amount of these pollutants discharged into the atmosphere is a function of the chemical composition of coal, the type of combustion unit used, the amount of coal used, and the effectiveness of the pollution control equipment (Environmental Protection Agency, 1979). Sulfur oxides are produced from the oxidation of approximately 95 percent of the available sulfur that is contained in the coal. The nitrogen oxides are produced from the oxidation of atmospheric nitrogen that is injected into the combustion unit and from the oxidation of nitrogen compounds contained in the coal. Particulate emissions, composed primarily of carbon, alumina, and iron oxide, are derived from the ash fraction of coal. Nonmethane hydrocarbons and carbon monoxides are also released during the combustion of coal; the quantity of these pollutants released is dependent on the efficiency of the combustion unit (Environmental Protection Agency, 1977). EPA has established regulations governing the rate of discharge of these pollutants into the atmosphere.

The quantity of each of the major pollutants that might be emitted from the coal-fired plant can be estimated, given the annual coal consumption, composition of the coal, and a pollutant-specific factor that is characteristic of the type of boiler used (dry-bottom, pulverized-coal type), according to the Federal Power Commission (1976), the agency that preceeded FERC. The following equations for calculating amounts of SO_x, NO_x, and particulates are presented and discussed in terms of a dry-bottom, pulverized-coal plant.

sulfur oxides

$$E_s = 1.96\ C\ S \times 10^{-2}$$

E_s = annual sulfur oxide emissions (1,000 tons)
C = annual coal consumption (1,000 tons)
S = average sulfur content of coal, percent

$$7.0 = (1.96)(651)(0.55) \times 10^{-2}$$

In the absence of pollution control equipment, the steam-generating plant could potentially produce 7,000 tons of SO_x per year. Current pollution control technology could reduce this by 99 percent, or produce an emission rate of 70 tons per year.

nitrogen oxides

$$E_n = d\ C \times 10^{-3}$$

n = annual NO_x emissions (1,000 tons)
C = annual coal consumption (1,000 tons)
d = boiler factor

$$5.9 = (9)\ (651) \times 10^{-3}$$

Approximately 5,900 tons of NO_x per year could be produced by the coal-fired plant. The mechanism by which this amount can be reduced is dependent upon the specific design of the combustion unit, the effectiveness of which cannot be determined at this time.

particulate emissions

$$E_p = A\ b\ C \times 10^{-2}$$

E_p = annual particulate emissions (1,000 tons)
A = ash content of coal, percent
b = boiler factor
C = annual coal consumption (1,000 tons)

$$44.3 = (8)(0.85)(651) \times 10^{-2}$$

The annual particulate emissions that could originate from the plant would be approximately 44,300 tons. Pollution control equipment can reduce this amount by as much as 99.5 percent, thus reducing particulate emissions to approximately 222 tons per year.

The actual ground-level concentration of pollutants emitted from coal-fired plants is ultimately dependent upon meteorological conditions and upon the efficiency with which the pollution control equipment is operated. The speed and direction of the wind and the turbulence and stability of the atmosphere determine the ground level concentration of the pollutants, the rate of discharge is primarily a function of the efficiency of such pollution control devices as scrubbers and electrostatic precipitators (U.S. Fish and Wildlife Service, 1978b). During routine maintenance of the boiler or the pollution control equipment, these devices may not remove sulfur oxides or particulates at the designed efficiency. During these times, the ground-level concentrations of pollutants potentially could exceed limits established by the EPA. Turner (1969) calculated that during a period when the pollution control equipment would be inoperative, and under the worst possible meteorological conditions, the ground-level concentrations of sulfur oxides and suspended particulates, during a 3-hour sampling period, could range betweeen 967 and 1,667 ug/m^3, and 24 and 42 ug/m^3, respectively.

According to the regulations contained in the Clean Air Act of 1970 (Act), amended in 1977, plans for locating a plant that would represent any new major pollutant source in a clean air area must be submitted to a review process, in order to obtain a permit for the prevention of significant deterioration. The coal-fired plant, according to requirements set forth in Section 169 of the Act, would be defined as a "new major source." As a part of the review process, the Applicant would be required to submit up to 1 year of preconstruction air quality monitoring data and to conduct an air quality analysis to demonstrate that emissions from the plant would not significantly increase local pollution levels (Environmental Protection Agency, 1980).

Air quality standards established by the Federal and state regulatory agencies are meant to protect the local air quality, but these standards do not insure that emissions from coal-fired plants would not adversely affect the quality of the human environment. For example, the long-range transportation of pollutants is not addressed in the regulations. According to a report published by the National Commission on Air Quality, large quantities of pollutants can be released without violating local ambient standards, and these emissions can cause serious acid deposition problems in downwind regions. In addition, local ambient standards address such pollutants as sulfur and nitrogen oxides; the standards, however, only indirectly concern such pollutants as sulfates and nitrates that are integrally involved in acid deposition (National Commission on Air Quality, 1981). Acid deposition has been implicated with such adverse environmental impacts as decreased forest productivity, elimination of fish populations from lakes, increased susceptibility of plants to disease, degradation of water quality, and decreased soil fertility.

Pollutants emitted from coal-fired plants that are not currently regulated by the EPA include such biologically hazardous compounds as benzene soluble organics, particulate polycyclic organic matter, benzo (a) pyrene, and polyhalogenated biphenols. Information concerning the quantity of these substances emitted from the coal-fired plants, as well as their origin during the combustion process, is limited. Bumb et al. (1980) indicated that chlorinated dioxins (polyhalogenated biphenols) are intimately associated with airborne particulate matter that originates from the combustion of fossil fuels. It is likely that a significant amount of these substances are collected by electrostatic precipitators and scrubbers. EPA is currently conducting studies that will provide for the establishment of standards for these compounds.

Trace elements that are released during the combustion of coal are also not currently regulated by the EPA (Environmental Protection Agency, 1979). The specific elements emitted from a coal-fired plant are determined by the chemical composition of the coal. These elements, which include heavy metals, are deposited as part of the bottom ash of the boiler and, to a larger degree, are complexed with the fly ash that is emitted from the boiler. The amount of these elements emitted from a coal-fired plant is largely dependent upon the efficiency of the electrostatic precipitators. A study performed by Stearns and Rodger (1975) for the Applicant's formerly proposed, 1,000-MW, coal-fired Pioneer Plant projected ground-level concentrations of such substances as molybdenum, uranium, fluoride, and barium to be from 100 to 10,000 times less than concentrations that are considered to be safe by the Occupational Safety and Health Administration. As reported by the Department of the Interior (1978b) minute quantities of these elements would accumulate in the surrounding environment during operation of the plant.

4.3.2 Noise Levels

During project construction, short-term local increases in noise levels would occur from the use of air compressors and heavy equipment. During project operations, local noise level increases would occur from continuous sources such as fans and cooling towers and from intermittent sources such as steam blowing and coal handling.

Staff believes that Federal and state governments would propose control measures to keep noise levels resulting from project construction and operation within established standards.

Some increases in noise levels due to project construction and operation would be unavoidable.

4.3.3. Geology and Soils

All construction activities that would disturb soils, alter natural slopes and drainage, or remove protective vegetative cover and supportive root systems could be expected to result in soil erosion. In addition, depending upon the siting of facilities and the design of slopes in excavated areas, some localized soil mass movement may occur.

It would be expected that appropriate criteria would be proposed for project design, construction scheduling, and construction, operation, and maintenance procedures, whereby soil erosion and soil mass movement would be precluded or minimized.

Some minor soil erosion would be unavoidable during construction, before protective measures could be implemented, and in areas where constant construction activity would preclude the effectiveness of mitigative measures.

4.3.4 Land Use

Because of the low relief between the steam plant site and the Thousand Springs Scenic Route and Interstate Highway 80, there would be an adverse impact on the recreational experience of persons who travel those routes for pleasure. The withdrawal of the land necessary to build the facility would be unlikely to have a significant impact on the agricultural or recreational use of land in the vicinity. If the Snake River water is used as the water source, the construction of a pipeline from the river to the plant site would result in adverse impacts on land use, since the pipeline would cross agricultural areas and lands that provide prime viewing and a variety of hunting opportunities.

4.3.5 Hydrology

During the construction of the project, water would be required for drinking, construction use, and treating domestic wastes. This water could be obtained either by withdrawals from the Wiley Reach of the Snake River or from wells in the area. The withdrawals from the Snake River would not significantly affect the flow regime, although groundwater withdrawals may lower the water table in the immediate project area. The lowering of the water table may affect other water users in the area; this depends on the quantity of water pumped and the location of other wells in the area.

Staff estimates that the operation of the project would require a withdrawal of 10 cfs (6.4 mgd) of water from the Snake River or from wells. This withdrawal is equivalent to less than 0.2 percent of the average discharge of the Snake River at the Hagerman gage and 0.4 percent of the minimum daily discharge of 3,970 cfs (U.S. Geological Survey, 1979). The 10 cfs (6.4 mgd) of water would be used in the plant for cooling purposes and treatment of wastes.

Withdrawal of 10 cfs (6.4 mgd) of water from wells in the area would lower the water levels in the project area. The drop in groundwater levels and the consumption of water may affect the discharge of springs and wells along the Wiley Reach of the Snake River, currently used by residents for fish farming, power generation, and domestic water supplies.

A portion of the water withdrawn from the wells or from the Snake River may reenter the Snake Plain Aquifer from the waste treatment ponds; the remainder would be lost to the atmosphere. None of the water withdrawn would be returned directly to the Snake River.

4.3.6 Water Quality

The impacts associated with construction of the coal-fired plant would be limited to the groundwater, unless the project site is located adjacent to the Snake River. Clearing of the site and removal of natural ground cover could increase the potential for erosion by wind and rainfall. Concrete for construction of the powerplant would probably be prepared at a batch plant located at the site. Runoff and wastewater from this plant would probably be collected in an evaporation pond, where water may enter the aquifer through the bottom and sides of the pond. In addition, project sanitary sewage would have to be collected and treated in an extended aeration package treatment plant, depending on the size of the construction force. Other methods may also be available, but all would probably use ponds to collect the treated waste water.

During operation of the coal-fired plant, the potential for groundwater and surface water contamination could result from the runoff from and infiltration through the coal storage piles and solid wastes generated from the combustion process. Wastes such as scrubber sludge, fly ash, and bottom ash, as well as coal-pile leachate, characteristically have trace amounts of heavy metals such as zinc, cadmium, mercury, and chromium (U.S. Fish and Wildlife, 1980). Improper management of these wastes could result in the introduction of these substances into the Snake River Plain Aquifer and the surface waters located in close proximity to the plant site. Typically coal piles are positioned on concrete aprons so as to allow for the collection of the runoff and leachate into a collecting basin. Similarly, the areas of the coal-handling facilities would be arranged to allow for diversion of runoff from these areas into the same collecting basin. Scrubber sludge and fly ash are usually stabilized and buried in a landfill. The landfill is then covered by an impermeable material such as clay, to minimize the infiltration of water into the waste and the subsequent introduction of contaminants into underlying aquifers.

The stilling basin would, in addition to the runoff from the coal pile, receive such process waste streams as cooling tower blowdown, sewage from plant facilities, the liquor of the scrubbers, sluice water from ash disposal, and the boiler ash. As a result, the basin would contain water characterized by high nutrient concentrations, heavy metals, and potentially hazardous organic compounds. Seepage of these substances into the groundwater would be dependent upon: (1) permeability of materials used to construct the basin, (2) pH of the pond leachate, and (3) location of the groundwater resources. These factors would have to be studied to determine the need for the lining of the basin with clay or a synthetic material. In addition, it is probable that the state water quality agency would require that monitoring wells be placed at the site to monitor groundwater quality so as to allow for early detection of groundwater contamination.

Failure of an impermeable lining and the subsequent introduction of the above-mentioned substances into the groundwater resources would adversely impact most of those uses, e.g., potable water supplies and irrigation for which this resource is used. The extent to which these uses would be impacted would primarily be a function of the discharge and recharge rate of the aquifer.

4.3.7 Aquatic Communities

If make-up water for the project is drawn from the Snake River, construction of the intake structure in the river would increase the levels of suspended solids, and would cause minor habitat alteration. These activities, however, are expected to be temporary, and could be minimized so they would not be expected to have a significant adverse impact on the aquatic biota.

Aquatic impacts from project operation include impingement and entrainment of organisms at the intake structure. The withdrawal of 10 cfs is a small proportion of the flow in the Snake River; therefore, only those organisms that would occur in the vicinity of the intake would be affected. Fish could likely avoid being drawn onto the screens by the intake current under the low intake velocities (0.5 foot per second or less) that would be required. Organisms drawn through the screens (entrained) at the intake structure would include fish eggs and larvae, zooplankton, and algae. The mortality of entrained organisms would be 100 percent, because the water would be recirculated within the project rather than returned to the river. Entrainment of fish eggs and larvae could be minimized by screening the intake with fine mesh screens that would prevent the passage of these small organisms.

Impacts to the Shoshone sculpin and the Snake River physa snail could likely be avoided by proper siting of the water withdrawal structure.

Additional impacts could occur to aquatic biota in the Snake River, depending upon the amount of contamination of the river and groundwater that could result from seepage from the waste treatment and bottom ash ponds as well as the coal and limestone storage areas, FGD, sludge disposal areas, cooling water blowdown, and sanitary waste treatment facilities.

4.3.8 Terrestrial Communities

4.3.8.1 Vegetation

Construction impacts would be associated primarily with clearing of 290 to 500 acres of shrub-steppe vegetation to accommodate such project facilities as generating units, cooling towers, evaporating ponds, coal piles, ash disposal sites, railroad spurs, and parking lots. Some riparian vegetation and agricultural land would also be cleared if construction of a pipeline from the Snake River was required.

The potential impacts on vegetation from operation of the project would be due primarily to gaseous and particulate stack emissions and to dust from the coal storage pile, limestone storage, and ash disposal.

The two major gaseous pollutants of coal-fired, electric-generating plants are $SO_x$and NO_x. Information on the effects of SO_x and NO_x on plants under field conditions is extremely limited (U.S. Fish and Wildlife Service, 1978). SO_2 injury can result in the death of the plant or a reduction in biomass. Injury depends upon the sensitivity of the plant, the duration and time of exposure, the amount of SO_2 to which the plant is subjected, and upon environmental factors such as water availability. Big sagebrush and potatoes are considered to be of intermediate sensitivity to SO_2 injury, whereas corn is considered resistant to injury (U.S. Fish and Wildlife Service, 1978).

The SO_x and NO_x emissions could also be associated with an increase in acid rain in the project area. The acid precipitation may be the most important secondary pollutant of coal-fired power plants. Acid rain would impact the terrestrial plants by affecting the above-ground portions of the plants that intercept the precipitation, and by causing changes in the soil chemistry.

The accumulation in the soil of trace elements produced by coal burning may have an effect on the production of plants in the vicinity of the powerhouse. The U.S. Fish and Wildlife Service (1978) discusses the accumulation effects of trace elements.

Dust would be produced from coal handling and ash disposal. Dust, settling on photosynthetic parts of plants, can decrease the amount of light absorbed by the plant and result in a lower rate of productivity. This decrease in biological productivity would also have an economic consequence, if agricultural fields are located close to the plant.

The impacts of SO_x, NO_x, dust, acid precipitation, and trace metal accumulation are expected to be minor because of the environmental restrictions imposed on stack emissions, although little research on the long-term effects of these pollutants on shrub-step vegetation has been conducted to determine actual impacts.

4.3.8.2 Wildlife Resources

The primary impact associated with the construction of the Bliss coal-fired, steam-electric plant would be the loss or alteration of approximately 500 acres of wildlife habitat and the displacement of the associated wildlife species. (See Section 3.3.7.2.) Potential impacts caused by operation include air and water pollution and obstruction of bird flight paths by tall structures. Mitigative measures to reduce impacts from air and water pollution could reduce these impacts, but site-specific studies would be needed before determining the impacts on wildlife species or a need for mitigation.

4.3.9 Socioeconomic Factors

Construction of the proposed coal-fired plant would require a peak labor force of from 400 to 800 construction workers. According to statistics of the Idaho Department of Employment (1979), the Twin Falls area would supply the majority of the construction labor force; however, a large number of workers would have to relocate in the area. Even if the number of workers was nearer 400 than 800, the possibility of a "boom town effect" exists for Bliss and other small towns in the area. A high level of planning and cooperation with local communities would be needed. The permanent labor force required to maintain and operate the plant would exceed 100 workers. The resultant increased demand on social services and housing would adversely impact the local economy. To mitigate the adverse impacts during the period of construction, it is possible that the utility managing the coal-fired plant would subsidize housing and provide for an increase in social services. Operation of the facility would stimulate the local economy through diversification of the tax base and increase in tax revenues and employment.

4.3.10 Visual Resources

Construction and operation of the coal-fired steam plant would significantly impact visual resources, because the materials, activities, operations, and resulting plant structures would be concentrated in an area of approximately 500 acres that is readily accessible to viewing from almost all directions. The opportunity to utilize existing landscape features to screen the plant is limited. The degree of the impact on visual quality would be progressively attenuated with increased distance from the site. These impacts are unavoidable.

4.3.11 Cultural Resources

The nature and extent of impacts to archeological and historic sites from construction and operation of the coal-fired, steam-electric plant are unknown. An archeological survey of the proposed plant location has not been conducted. Based upon archeological and ethnographic work in the vicinity, as well as the history of the Bliss area, it is expected that archeological and historic sites would be impacted by the construction and operation of the project.

4.3.12 Mining Operations

The resources of the Black Butte Mine site are currently affected by the ongoing mining operations. Approximately 400 acres of land are mined each year to facilitate the production of 3.6 million tons of coal annually. An additional 40 to 60 acres of land would have to be mined each year to provide for the increase in coal production (651,000 tons per year) necessary to fuel a 250-MW, coal-fired alternative. The following discussion deals with the environmental impacts associated with the current mining operations in general.

Operation of the coal mine would reduce the air quality of the mine site in the immediate area. There would be an increase in the concentration of total suspended particulates that originate from the coal-handling facilities, haul roads, and wind erosion of exposed soils. In those areas actively being mined, emissions associated with the operation of construction equipment would increase above ambient levels the concentrations of such pollutants as carbon monoxide, sulphur dioxide, and nitrogen dioxide. The operators of the mine could reduce the generation of dust by treating haul roads and by stabilizing disturbed areas rapidly. Fifty to 70 percent of the particulate emissions originating from the mine site would be produced from the overburden-removal operation, and this source is difficult to stabilize. Calculations performed by the U.S. Department of the Interior (1978a) indicated that given worst-case conditions, significant increases in suspended particulates could occur as far away as 20 miles from the mine site. Thus, it is probable that operation of the mine would increase the concentration of suspended particulates, and under certain meteorological conditions, this increase could be significant.

The land that would be set aside for coal-handling facilities, stockpiles, and haul roads, and those portions that are being actively mined, would be restricted to those uses throughout the life of the mine (26 years). Grazing and other land uses would be eliminated from these areas during this time, resulting in a loss of animal production and recreational use. The mined land could not be used for grazing until a stable vegetative cover is established. Recreational uses and grazing are to return to premined levels once native vegetation becomes reestablished (U.S. Department of the Interior, 1978a). Guidelines set forth in the Surface Mining and Reclamation Act (SMRA), require the mine operator to return the mined areas to pre-mine use within 10 years (See Section 3.3.12).

The removal of vegetative cover and the subsequent disturbance of topsoil and underlying bedrock would substantially increase the amount of soil that would be eroded by wind and water from the mined land. Approximately three times more soil would be lost from the disturbed areas than was lost from the land surfaces prior to mining. It is estimated that this increase would amount to 2.5 tons of sediment per acre per year. In addition, mixing of the soil horizons, compaction, and a reduction in the soil biota that results from removal, stockpiling, and grading of the topsoil would result in a reduction in soil productivity. Studies have demonstrated, however, that the reclamation of mined lands in southwest Wyoming is successful. The impacts associated with the soils are addressed in the SMRA regulations, through performance standards that regulate the process of removal of the topsoil, segregation of soil horizons, and storage and distribution of soils on reclaimed land. Adherence to these standards appears to be sufficient to minimize potential losses in soil productivity.

The wildlife habitat located within the areas to be disturbed, and in the areas located immediately adjacent to the mine, would be eliminated or adversely impacted. Wildlife populations would not return to premined levels until vegetation endemic to the area has been established.

The natural drainage of Bitter Creek would be eliminated, and the runoff from the watershed would be diverted from actively mined sites into a series of impoundments and man-made channels. Erosion of exposed soils and weathering of spoil material would increase the suspended and dissolved solid loads of the watercourses draining the mine area. Actual excavation of the mine pit and removal of the coal seams would disrupt the Union, Lance, Wasatch, and Almond Aquifers; however, the impacts to the quality and quantity of groundwater within the area are not clearly defined. Some studies have indicated that although there would be no impact on groundwater quality initially, the levels of dissolved solids may increase over an extended period of time. Excavation of the mine pit would lower the water table in the immediate area of the mine, although the long-term impacts are unknown. The SMRA addresses potential problems with groundwater impacts, but it remains unclear whether the quantity and quality would be adversely impacted (D. Larry Domrau, Office of Surface Mining, Denver, Colorado, to Lon Crow of FERC staff, May 18, 1981, personal communication). Archeological and historical sites would be also impacted by the coal-mining operation. A plan has been adopted that would avoid or mitigate impacts to significant sites.

Increases in employment and tax revenues associated with the increased coal production would benefit the local economy;

increases in employment would also create an increased demand on social services and would contribute to the problems associated with rapidly growing towns.

Personnel from the Wyoming Department of Ecology continually monitor operation of the mine. Regular inspection tours are conducted to evaluate reclamation efforts, to maintain drainage ways, and to ensure that the mine operator is in compliance with environmental regulations.

4.4 NO ACTION--ALTERNATIVE 3

The no-action alternative would result in the maintenance of the diversity of environmental resources and values described in Section 3.1. Opportunities for enhancement of these resources may also be possible through several Federal and state programs described in Section 4.6.2 and 4.6.3.

4.5 COMPARISON OF RESOURCES IMPACTED

Each of the resources and environmental values discussed previously for the proposed A.J. Wiley Project and the alternatives are summarized in Table 4-5. The information provided represents the major impacts on a given resource and is qualified only by the mitigative measures proposed by the Applicant or required by Federal and state regulations. The reader should recognize that the impacts summarized in Table 4-5 do not reflect additional mitigative measures that may be recommended by Federal, state, or local agencies, or the FERC staff, and should see Section 5.2 for a discussion of proposed mitigative measures being recommended by the aforementioned agencies.

4.6 RELATIONSHIP TO LAWS AND POLICIES

4.6.1 Desert Land Act and Carey Act

The Bureau of Land Management (BLM) recently completed a study of the agricultural potential of 440,000 acres of public land located in the Snake River Plain of southwest Idaho. The lands, administered by the Boise District Office, are located in portions of Owyhee, Elmore, and Twin Falls Counties. Much of the public land that was evaluated is concentrated in the Saylor Creek and Bennett Mountain planning units, which border the Snake River from the vicinity of Upper Salmon Falls Reservoir downstream to the vicinity of Hammett, Idaho (Bureau of Land Management, 1980).

Based on the results of the study (Bureau of Land Management, 1980), BLM determined that farm development could

Table 4-5. Comparison of the impacts of the proposed project and alternatives on resources and environmental values (Source: staff).

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric plant	Alternative 3, no action
Net electrical energy produced:				
Average case	485.4 GWh	485.4 GWh	485.4 GWh	None
Maximum (1972)	634.3	634.3	591.5	
Minimum (1935)	355.4	355.4	369.7	
Cost of project energy				
Total capital cost plus interest (for midpoint of construction)	$212,330,000	$199,470,000	$174,700,000	
1986 total annual operating cost	$38,840,000 80.0 mills/kWh	$37,220,000 76.67 mills/kWh	$42,530,000 87.63 mills/kWh	
50-year, present worth levelized annual cost	$39,370,000 81.1 mills/kWh	$38,330,000 78.97 mills/kWh	$52,240,000 107.63 mills/kWh	
Air quality	Minor increase of exhaust emissions and dust during construction; negligible during operation.		Emissions from coal-fired plant would result in increases in the concentration of NO_x, SO_x, and particulates and of potentially hazardous pollutants in the surrounding environment. Efficient operation of pollution control devices would maintain ambient level concentrations of NO_x, SO_x, and particulates within Federal standards and would minimize emission of nonregulated pollutants. Impacts associated with long-range operation of the coal mine would result in localized increases in suspended particulates.	None

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric plant	Alternative 3, no action
Water resources: uses and flows	Water levels in the tailrace area of the Lower Salmon Falls and Lower Malad powerplants would be 1-2 feet and 17 feet higher, respectively. Several small hydro powerplants would be affected by the proposed reservoir and would have to be relocated.		Groundwater levels would be lower in the immediate vicinity of the plant if aquifers are utilitzed as water source during construction. Operation of plant could consume 10 cfs of water from the Snake River.	None
	Use of existing head of springs for electric power generation reduced.			
	Daily or weekly water level fluctuations in upper part of proposed reservoir projected up to 1-foot; fluctuations near Malad River less than 0.5 feet.			
	Groundwater levels in adjacent areas would increase to approximately elevation 2,735 feet. Hydraulic retention time increased from half a day to 7 days.			
Water quality	Increased turbidity levels during construction and filling of reservoir.		Potential for seepage of toxic material from wastewater ponds. Impacts to groundwater can be prevented by placing an impermeable liner in ponds and establishing a groundwater monitoring network to ensure the integrity of the liner.	None
	Increased concentration of nutrients and dissolved or suspended solids in project reservoir during initial year of operation. Reservoir would act as a heat and nutrient trap. Water temperature in Upper Bliss Reservoir would be cooler in summer and may receive lower concentration of dissolved or suspended solids. Increased sediment load from reservoir inundation of toe of the Bliss landslide.			
	Providing that the project is operated as a run-of-the-river facility, the proposed reservoir would not undergo thermal stratifition or be more eutrophic than it is currently.			

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric plant	Alternative 3 no action
Tributary drainages	Approximately 500 feet of Malad River would be inundated along with 45 feet of Lower White Springs. Mouths of several small streams would also be inundated.			None
Geology and soils	Increased erosion during construction. Temporary increase in bank erosion in new reservoir. Increased slumping and subsequent erosion at inundated toe of Bliss slide area and other potentially unstable clay and silt deposits along reservoir shoreline. Necessary mitigative measures are available.		Increased erosion during construction.	None
	Potentially substantial seepage-induced foundation problems and hazardous bank conditions downstream from dam due to extensive permeable formations. Necessary mitigative measures are available.	Potential seepage-induced foundation problems due to underlying permeable formations, considerably less than at proposed site. Necessary mitigative measures are available and at lower cost than for proposed site.		
Minerals			651,000 tons of coal per year (250 MW) 272,400 tons of coal per year (86 MW)	
Aquatic resources: fishery	Inundation of 8 miles of Snake River, 500 feet of Malad River, and hundreds of feet of stream at the mouths of many other springs would result in a loss of spawning and rearing habitat; reduction in populations of rainbow trout, Shoshone sculpin, and, likely, white sturgeon in response to habitat losses.		Potential contamination of Snake River could impact fish populations; potential groundwater contamination could impact hatcheries along the Snake River that are dependent on springs for their water source. (See water quality.)	None
	Coldwater fish may be affected if dissolved oxygen levels are less than 7.0 mg/l.			
	Fish mortality caused by turbines.			

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric	Alternative 3, no action
Threatened or endangered species	No Federally listed animals, but 3 candidate species would be impacted. Reduction in populations of Shosone sculpin, Bliss Rapids snail, and Snake River Physa snail in response to habitat losses.		Potential contamination of of Snake River populations (See water quality).	None
Aquatic invertebrates	Reduction in species diversity and population in response to habitat changes from lotic to lentic conditions.		Potential contamination of Snake River could impact population. (See water quality.)	None
Aquatic vegetation	Periphyton communities replaced largely by phytoplankton and some rooted aquatic plants in the shoreline areas. The potential for algal blooms in the project reservoir during the summer months is great.		None	None
Vegetation	Inundation of 390 acres of vegetation: 12 acres of wetland, 18 acres of herbaceous riparian, 86 acres of woody riparian, 99 acres of shadscale, 130 acres of sagebrush, 43 acres of agriculture, and 1 acre each of talus-cliff and disturbed-developed vegetation.	Inundation of approximately 285 acres of vegetation. This includes 1 acre of herbaceous riparian, 71 acres of woody riparian, 63 acres of shadscale, 105 acres of sagebrush, 45 acres of agriculture, and 1 acre each of talus-cliff and disturbed developed vegetation.	290-500 acres of sagebrush-steppe vegetation would be altered by a 250-MW coal plant. Between 40 to 60 acres of land would be mined per year to provide the coal necessary to fuel a 250-MW, coal-fired alternative (651,000 tons per year).	None

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric plant	Alternative 3 no action
Vegetation (continued)	Use of an additional 366 acres of vegetation for borrow, spoil, and service areas and transmission lines. These would be reseeded. Acreages include 5 acres of woody riparian, 49 acres of shadscale, 254 acres of sagebrush, and 58 acres of agriculture.	Use of an additional 412 acres of borrow, spoil, and service areas and transmission lines. These would be reseeded. Acreage includes 10 acres of wetland, 7 acres of herbaceous riparian, 16 acres of woody riparian, 53 acres of shadscale, 268 acres of sagebrush, and 58 acres of agriculture.		
Unique vegetation types	Hackberry (Celtis reticulata) groves in which the trees reach unusual height would be lost. Also groves of native birch (Betula occidentalis), which are uncommon in the area, would be lost.		None	None
Threatened or endangered plant species	No Federally listed plants, but 3 candidate species could be impacted (Astragalus purshii var. ophiogenes, A. atratus var. inspetus, and Erigeron latus.		No Federally listed plants	None
Wildlife habitat	A maximum of 756 acres of wildlife habitat would be destroyed, including 121 acres of wetland and riparian habitat.	A maximum of 697 acres of wildife habitat would be destroyed. If spoil site S2 right and service area SA1 are moved upstream of the Bliss Bridge site, approximately 25 acres of wetland-riparian habitat would not be lost. In addition, a 6.7-acre channel island with riparian vegetation and nesting geese would not be inundated.	Approximately 500 acres of wildlife habitat would be eliminated by a 250-MW coal plant. Between 40 to 60 acres of land would be mined per year to provide the coal necessary to fuel a 250-MW, coal-fired alternative (651,000 tons per year).	None

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam-electric plant	Alternative 3, no action
Wildlife	The following wildlife groups would be most affected: upland game, nongame birds, aquatic furbearers, and small and medium-sized mammals.		Small and medium-sized mammals, nongame birds, and raptors.	None
Management area affected	A BLM wildlife management area would be inundated.	The BLM wildlife management area would not be inundated.	Unknown	None
Recreation	One of the few remaining significant whitewater boating reaches in the Upper Snake River Basin would be inundated. River fishing for trout would be lost. Upland hunting use and naturalist activities would be diminished.		Some restriction on ORV and hunting uses.	None
	Potential for Wild and Scenic River designation would be lost.		None	None
Land use	A maximum of 756 acres would be removed from present use, including 100 acres of agricultural lands and the equivalent of 50 AU per month of grazing.		500 acres would be removed from existing agricultural and range use by a 250-MW coal plant. Between 40 to 60 acres of land would be mined per year to provide the coal necessary to fuel a 250-MW, coal-fired alternative (651,000 tons per year).	None
	Potential designation as a National Natural Landmark would be terminated.			None
Socioeconomic:				
Peak on-site labor force/ number of years	344/ 2 1/3 years	344/ 2 1/3 years	400-800/ 4 to 6 years	None
Permanent	1 or 2	1 or 2	50 to 120	None

<table>
<tr><th>Resources impacted</th><th>Proposed Action, A.J. Wiley Project</th><th>Alternative 1, Bliss Bridge site</th><th>Alternative 2, coal-fired, steam-electric plant</th><th>Alternative 3, no action</th></tr>
<tr><td>Housing</td><td colspan="2">Housing for construction force should be adequate.</td><td>May require establishment of temporary housing for construction workers.</td><td>None</td></tr>
<tr><td>Public service</td><td colspan="2">Should be minor impacts concentrated during construction.</td><td>Amount of impacts depend on actual number of workers required.</td><td>None</td></tr>
<tr><td>Relocation and reestablishment of businesses</td><td colspan="2">Snake River Pottery, Inc., an alcohol plant, a gravel washing plant, and businesses related to agricultural, would be forced to relocate. Part of relocation expenses would be borne by owners. Business income would be lost during relocation and time taken to reestablish business. Snake River Expeditions, Inc., would be put out of business. Future revenues or reduction in cost from generating electrical power would not be realized.</td><td></td><td></td></tr>
<tr><td>Residence</td><td colspan="2">Four residential dwellings would be inundated. Owners may incur additional expense of purchasing property at prevailing interest rates.</td><td></td><td></td></tr>
<tr><td>Visual resources</td><td colspan="2">Extravagant variety, yielding high visual quality; some minor short-term construction impacts; visual quality affected because of resulting lacustrine environment; some minor impacts from man-made intrusions.</td><td>Direct impacts confined to immediate area with indirect impacts affecting a larger area.</td><td>None</td></tr>
</table>

Resources impacted	Proposed Action, A.J. Wiley Project	Alternative 1, Bliss Bridge site	Alternative 2, coal-fired, steam electric plant	Alternative 3, no action
Cultural resources	Two eligible properties for the National Register of Historical Places and one potential eligible property would be impacted. Two additional potential eligible properties could be impacted, depending on the location of spoil and borrow areas and the transmission corridor.	Similar to the proposed action, except the impacts to eligible property 10GG1 could be less substantial.	Impacts at the plant site are unknown. Archeological and historic sites would be impacted at the mine site.	None
Noise level	Increase during construction but conforming to Federal standards; negligible during operation.		Increase during construction but conforming to Federal and state standards. Continuous and intermittent during operation.	None

be allowed on 176,310 acres under the authority of the Desert Land Act (DLA) and Carey Act (CA). This acreage generally represents the land with soils suitable for irrigated crop production. In addition, an estimated 58,310 acres with agricultural potential, but having higher public values for wildlife habitat, cultural sites, air strips, sanitary landfills, or gravel sites, would be excluded from agricultural development.

BLM estimated that about 90 percent of the land would be irrigated by high-lift pumping from the Snake River, and the remainder by groundwater pumping. An alternative source of water for the land on the Bruneau Plateau located south of Bliss and west of Hagerman would be the Bruneau Plateau Water Development Project proposed by the state. This project, if developed, would divert water at Milner Dam through a canal into two storage reservoirs for irrigation water releases (Bureau of Land Management, 1980).

BLM has decided to initially process DLA and CA applications for lands with better than marginal suitability for irrigated crop production and with a required water lift of less than 500 feet above the Snake River (Bureau of Land Management, 1980). As of January 1, 1979, there were 531 DLA and 16 CA project applications for an estimated 270,000 acres of land in southwest Idaho, of which about 64,000 acres are subject to overlapping applications. BLM intends to reject applications on lands not found suitable for irrigated crop production and to process the remaining existing applications at a rate of about 20,000 acres per year (Bureau of Land Management, 1980).

Should farm development proceed to the maximum use of lands found suitable by BLM in the study area, there would be significant disruptions of the existing environment. Approximately 357,000 acre-feet of water would be diverted from the Snake River by high-lift pumping per year. During an average year, flows in the Snake River in June, July, and August would be reduced an estimated 16 to 20 percent. The reduced flows would lead to a reduction in stream-wetted area, which would result in reducing fish populations approximately 25 to 50 percent (Bureau of Land Management, 1980). The free-flowing sections of the Snake River would receive the major impacts; reservoirs would only be minimally impacted. Approximately 37,944 acres would be expected to be irrigated by wells. The annual use of 97,000 acre-feet of groundwater would likely deplete the aquifers (Bureau of Land Management, 1980). Approximately 207,080 acres of existing wildlife habitat would be lost, with a resulting reduction in native wildlife species, although planned upland and waterfowl species populations would be expected to increase. Approximately 233,220 acres of grazing land (21,545 AU) would be lost (Bureau of Land Management, 1980).

The methods required to bring irrigation water to the desert lands in southwest Idaho require additional electric power. BLM estimated that under maximum development, the total load on the Applicant's system to support the new farms would be about 843,395 MWh during an average year, with a peak of 307.5 MW in July.

4.6.2 National Natural Landmarks Program

The National Natural Landmarks Program was established in 1963 by the Secretary of the Interior (Secretary) to identify and encourage the preservation of nationally significant examples of the ecological and geological character of the United States. The significance of an area is tested by scientific evaluation and by comparison with like resources to determine if the area is a distinct and representative illustration of the Nation's natural heritage. After several stages of review, notice, and comment, should an area be designated by the Secretary as a National Natural Landmark, it is placed on the National Registry of Natural Landmarks.

The program does not involve Federal acquisition of land or restriction of the landowner's use of their land. Instead, the program depends on voluntary cooperation by the landowners to protect the significant natural values of their property. The program provides for the collection, dissemination, and use of complete and accurate information to assist developmental planning and decision making by indicating which resources are relatively significant, and which are of lesser importance, in order to avoid inadvertent damage to, or destruction of, nationally significant natural features (Federal Register, vol. 45, no. 238, Tuesday, December 9, 1980, pp. 81,184-81,193).

The Wiley Reach has been recommended for designation as a National Natural Landmark. Preliminary studies have been completed (Bowler, 1981). According to the Pacific Northwest Region of the National Park Service (NPS), the Wiley Reach meets the standards for further consideration as a possible landmark. Depending upon the availability of funds, the study would be presented to a panel of at least three natural scientists outside of NPS for independent review and evaluation. Should the area appear to qualify for landmark designation, the recommendation would continue to be processed according to the procedures in CFR 36, Part 1212, for nomination as a natural landmark, and would be presented to the Secretary for final action (Gordon Atkins, National Park Service, to Gordon Warren of FERC staff, November 2, 1981, personal communication).

4.6.3 Nationwide Rivers Inventory

The Wiley Reach has been included in the Nationwide Rivers Inventory. The inventory, compiled by the NPS, attempts to identify the Nation's remaining free-flowing rivers and river segments that meet the criteria for wild, scenic, and recreational rivers according to the standards established under the National Wild and Scenic Rivers Act (P.L. 90-542). The inventory provides information concerning the environmental and recreational values and significance of freeflowing rivers for Federal, state, and local agencies, and citizen groups involved in water resource development and other river-related issues. In addition, the inventory identifies potential candidates for inclusion in the Wild and Scenic Rivers System. Inclusion of a river segment in the Nationwide Rivers Inventory may indicate the significance and values of the resources, but does not confer any protection from development should that alternative be chosen after due consideration (Heritage Conservation and Recreation Service, 1980).

The inventory of free-flowing rivers in the northwestern United States is being accomplished in two phases. The first phase, a report on relatively natural river areas that meet the standards for wild or scenic status under the Act, has been completed (Heritage Conservation and Recreation Service, 1980). The second phase of the inventory concerning river areas that meet the standards as recreational rivers under the Act has not been funded. Recommendations for river areas to be included in the inventory would, if accepted by NPS, be submitted to a panel outside of NPS for independent review and analysis concerning the relative value and significance of the resource. Should the proposed area qualify for inclusion in the inventory, the recommendation would be processed by NPS, and when placed in the inventory, the river area would be qualified for future consideration and study for possible inclusion in the National Wild and Scenic Rivers System.

4.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

For purposes of this environmental impact statement, the construction and operation of project facilities should be considered a permanent change of the affected environment, and should not be limited to the normal 50-year license period and 35-year life of hydroelectric and coal plants, respectively.

Resources that would be used in construction and operation of the proposed project and Alternatives 1 and 2 would include land, minerals, and supplies; water from the river or aquifer; human skill and labor; and capital. Some of the resource commitments would be irreversible and irretrievable, such as construction materials and supplies that could not wholly be salvaged after use. In addition, construction either of the project, or of Alternatives 1 and 2, would commit the affected area to a new pattern of recreational and land use allocations.

4.7.1 A.J. Wiley Project--Proposed Action

A permanent commitment of land resources would be made at the project structures and facilities. Inundation of land by the project reservoir would preempt the current use of this land for river fishing, hunting, agriculture, business, and small hydropower production; this action would constitute an irretrievable commitment of these resources for the life of the project. Inundation of this land would also eliminate regionally scarce riparian vegetation and associated wildlife that currently utilize this habitat. Loss of the riparian habitat would probably constitute an irreversible and irretrievable commitment of resources, since it is believed that the riparian vegetation would not return to its present status, even if project facilities were removed and the Snake River was allowed to return to a free-flowing state. The segment of the wildlife population dependent on the riparian habitat would be forced to migrate to adjacent areas and to compete with existing wildlife populations for food and cover. If the adjacent riparian habitat areas are at their carrying capacity, the numbers of wildlife in excess of that level would be irretrievably lost.

The project would also inundate an 8-mile reach of the Snake River. Populations of aquatic plants and animals dependent on the flowing nature of the river would be reduced or eliminated. The abundance of existing fish species and the character of the fishery would be changed for the life of the project. The loss of this 8-mile reach of the Snake River would constitute an irreversible commitment of this resource, since it is highly unlikely that project facilities would be removed once in place. River-related activities such as whitewater boating would also be preempted from this reach of the Snake River, and constitute an irreversible commitment of resources.

4.7.2 Bliss Bridge Damsite--Alternative 1

The irreversible and irretrievable commitments of resources related to Alternative 1 are similar to those described in Section 4.7.1 for the A.J. Wiley Project.

4.7.3 Coal-fired, Steam-electric Project--Alternative 2

A permanent commitment of land resources and associated vegetation and wildlife resources would be made to accommodate Alternative 2. A major irreversible and irretrievable commitment of a resource would be the burning of 814,000 tons of coal per year for the life of the project. In addition, limestone and other chemicals would also constitute irretrievable commitments of resources.

4.8 RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Short-term uses of the environment are considered to be those uses that would occur during the construction and operation of the project, through a license period of up to 50 years and a 35-year life of the hydroelectric and coal plants, respectively. The long-term productivity of the affected environmental resources is discussed in terms of meeting the future energy requirements of the ratepayers in the Applicant's service area and providing for the best comprehensive plan for improving or developing the project reach.

4.8.1 A.J. Wiley Project--Proposed Action

The proposed project would provide 70.5 MW of dependable capacity to help meet projected summmer peak loads. The project would utilize the kinetic energy in falling water to generate a net increase of 485 GWh of electric energy annually under average streamflow conditions. The minimum and maximum net energy generated by the project would be approximately 355 and 634 GWh, respectively.

Continued utilization of the existing resources in the project area for whitewater boating, river fishing, power generation, and residential and business purposes would not be possible if the project is constructed. In addition, maintenance of the riparian habitat for wildlife and its intrinsic value would not continue. The implementation of mitigative measures proposed by the Applicant and the adoption of additional measures recommended by governmental agencies would lessen the impacts of the project on some of the environmental resources.

Although the project would provide a new source of electric capacity and energy to meet the future energy demand in the service area, it would result in a reduction of net productivity (loss of riparian vegetation and associated wildlife) and an overall reduction of the diversity and quality of environmental resources and values now found in the 20-mile reach of the Snake River between Bliss Dam and the Upper Salmon Falls Dam.

4.8.2 Bliss Bridge Damsite--Alternative 1

The relationship between short-term use and long-term productivity is similar to that discussed for the A.J. Wiley Project.

4.8.3 Coal-fired, Steam-electric Project--Alternative 2

The coal-fired plant would provide 200 MW of dependable capacity throughout the 35-year design life of the plant. At the end of the 35 years, a new plant would have to be constructed at another location or older equipment would have to be replaced or upgraded. To provide the energy generated by the plant for 50 years would require 33 million tons of coal and approximately 357,000 acre-feet of water. Those areas of the coal mine being actively mined to produce coal for the plant would be confined to mining operations throughout the life of the plant, or up to 50 years. The 500 acres of agricultural land and wildlife habitat that would be occupied by the plant would probably never return to their original use. Loss of crops and animal production would accompany the loss of farmland and wildlife habitat. Increased demand for social services would occur during construction of the plant, but tax revenues associated with power generation should offset this demand and eventually should benefit the local economy.

The generation of 1,533 GWh of electrical energy annually by a coal-fired plant would reduce the Applicant's reliance on hydroelectric resources, the energy output of which is governed by streamflow, and therefore help meet future energy demands; however, construction and operation of the plant would result in losses in agricultural land and wildlife habitat.

Section 5

STAFF CONCLUSIONS

This section describes the most significant environmental impacts of the proposed action and alternatives, after considering the proposed mitigative measures and analyses in Section 4.

Mitigative measures recommended by FERC staff and other agencies for the proposed action and alternatives are discussed. These mitigative measures are those deemed necessary by FERC staff or various agencies to further reduce or eliminate the adverse impacts of the proposed action or alternatives on the environment.

Unmitigatable environmental impacts are those adverse effects that cannot be reduced or eliminated by the mitigative measures recommended by the Applicant, FERC staff, or agencies.

5. STAFF CONCLUSIONS

5.1 SIGNIFICANT ENVIRONMENTAL IMPACTS

5.1.1 A.J. Wiley Project--Proposed Action

5.1.1.1 Construction

The construction of the proposed A.J. Wiley Project would result in the following significant environmental impacts:

(1) The loss or alteration of approximately 756 acres of vegetation, including 12 acres of wetland, 18 acres of herbaceous riparian, 91 acres of woody riparian, 148 acres of shadscale, 384 acres of sagebrush, 101 acres of agricultural, 1 acre of talus-cliff, and 1 acre of disturbed-developed vegetation types. (See Table 4-1.) Approximately 390 acres of this vegetation would be lost through inundation, including populations of _Astragalus purshii_ var. _ophiogenes_, a plant species of limited distribution. The loss of the wetland, herbaceous riparian, and woody riparian vegetation types is considered to be the most significant vegetational loss. The wildlife species associated with these habitats would be displaced and would perish if surrounding habitats could not assimilate the increase in animal numbers. Included in the 756 acres of vegetation are 215 acres of private land and 10 acres of state land.

(2) The loss of the existing rainbow-trout river fishery and the substitution of a reservoir fishery of unknown quality.

(3) Increased erosion and water turbidity resulting from construction of the dam and filling of the reservoir.

(4) Inundation of one of the last significant whitewater reaches of the Upper Snake River Basin, which would eliminate whitewater boating use in the area and would put a commercial rafting operation (Snake River Expeditions) out of business. (See Section 4.1.11.3.) Whitewater boaters and other recreationists in the Twin Falls area would have to travel a longer distance at greater expense to the Salmon River to experience rafting in a river similar to the Wiley Reach of the Snake River.

(5) The loss of 8 miles of free-flowing river and associated habitat used by fish, wildlife, and people, and the subsequent creation of a reservoir, would result in a continuous series of reservoirs, extending 20 miles from the Upper Salmon Falls Reservoir to Bliss Dam.

(6) The end of consideration of the Wiley Reach as a potential Wild and Scenic River or National Natural Landmark.

(7) A significant reduction in upland game hunting opportunities and dispersed recreational use of the river environs.

(8) A great reduction or a loss of scientific research and educational opportunities to study aquatic and terrestrial species and ecosystems endemic to the Wiley Reach, and restricted to Idaho (Section 4.1.7).

(9) Inundation by the reservoir of four homes, one small business (Snake River Pottery, Inc.), several trout ponds, and a gravel operation, and the removal of several small powerplants and a fuel alcohol plant.

(10) Additional costs to the homeowners and the owners of the Snake River Pottery, Inc., and other businesses for relocating and reestablishing businesses because of the increase in the cost of property and high interest rates. Revenues from trout farming, agriculture, and other commercial ventures may not be realized during the time it takes to relocate and reestablish businesses.

5.1.1.2 Operation

Once constructed, the operation of the proposed A.J. Wiley Project would have the following significant environmental impacts:

(1) Approximately 366 acres of land used for borrow, spoil, and service areas and transmission line right-of-way would be reseeded with grasses. The riparian vegetation would be difficult to reestablish with the previous diversity of species and with the "strip" type of growth that now exists along the shoreline of the Wiley Reach.

(2) Wildlife species that rely on natural vegetation for food, cover, and nesting sites would be lost.

(3) Eight miles of white sturgeon rearing habitat and possible spawning habitat would be altered, thus increasing the likelihood of the eventual elimination of white sturgeon from the Wiley Reach of the Snake River.

(4) Elimination of eight populations of Shoshone sculpin and most of the habitat in the Wiley Reach of the Snake River Physa snail and Bliss Rapids snail, all candidates for Federal listing as threatened or endangered species.

(5) Recreational use of project waters would be restricted to avoid conflicts with wildlife mitigative programs.

(6) Water level fluctuations up to 1 foot over short periods of time would result in erosion and sedimentation impacts on shoreline recreational use, and may affect the success of any riparian vegetation mitigative program, especially in the upper part of the proposed reservoir.

(7) Greater retention of heat, sediment, and nutrient substances by the reservoir would result in the decline in overall water quality during the initial years following the filling of the reservoir. This would be followed by a reduction in suspended and dissolved solids and nutrients after decomposition of the materials in the reservoir had progressed. Cooler water temperatures and lower dissolved oxygen levels may characterize the water discharged from the proposed project.

(8) The effects outlined in item 7, in combination with the reduction in water velocity, would result in increased aquatic plant production in the proposed reservoir. Algal blooms and luxuriant growth of submerged aquatic plants may characterize the proposed reservoir during the summer months, and may result in greater variations in dissolved oxygen, which could affect salmonids.

(9) The potential for reservoir-induced landsliding and subsequent intense erosion could develop at the inundated toe of the Bliss landslide and at the potentially unstable clay and silt deposits along the reservoir shoreline.

5.1.2 Bliss Bridge Damsite--Alternative 1

5.1.2.1 Construction

The construction of Alternative 1 would have significant environmental impacts similar to the proposed A.J. Wiley Project. If service area S1 and spoil site S2 right (Figure 2-8) are relocated upstream of the alternative damsite, and if Shoestring Road is relocated, approximately 25 acres of wetland and riparian vegetation would not be inundated. In addition, a 6.7-acre channel island that is used by nesting geese, and the herbaceous riparian vegetation on the island, would not be inundated. (See Figure 4-7).

5.1.2.2 Operation

The operation of the Bliss Bridge alternative would be similar to the proposed A.J. Wiley Project and would have similar impacts on the environment. The potential for reservoir-induced landsliding and subsequent intense erosion could develop at the excavated and inundated portions of the toe of the Bliss landslide, and in partially excavated slide materials at the intake channel and tailrace.

5.1.3 Coal-fired, Steam-electric Project--Alternative 2

5.1.3.1 Construction

The construction of a 250-MW coal plant result in the following significant environmental impacts:

(1) Approximately 500 acres of vegetation would be altered or destoyed and would be lost to grazing, agricultural uses, dispersed recreational uses, and use as wildlife habitat.

(2) The influx of 400 to 800 workers into the Bliss area for a construction period of approximately 5 years would increase significantly the demand on the social services presently provided for a population of 200 people. A "boomtown effect" could result, affecting services in Bliss and other small towns in the area. A similar impact on the natural resources of the area would be expected.

5.1.3.2 Operation

The operation of a 250 MW coal-fired plant would also result in the following significant environmental impacts:

(1) An increase of over 100 permanent jobs would expand the local economy. Diversification of the local tax base would lead to increased revenue. This can be viewed as positive or negative, depending on one's position on local development; land values, crime, and demand for public services would all increase. A permanent work force of over 100 people would increase substantially the long-term demand for permanent housing and for such services as water supply and sewage treatment.

(2) Dispersed recreational use would be inhibited in the vicinity of the facility, and recreational demand would increase in the area.

(3) Ambient concentrations of sulfur oxides, nitrous oxides, and particulates could reach significant levels under certain meteorological conditions, especially if pollution control devices were inoperative for some period. Long-range transportation of pollutants from the coal-fired plant could contribute to the adverse impacts associated with acid precipitation.

(4) Seepage from the settling basin, coal storage piles, and fly-ash and scrubber-sludge disposal areas could introduce trace elements and various organic compounds into surface water or the water table if these areas are not lined with an impermeable material.

(5) Consumption of coal, a nonrenewable resource.

5.1.4 No Action--Alternative 3

The selection of Alternative 3 may have the following impacts on the Wiley Reach of the Snake River:

(1) The resources would be used to a greater degree in future years.

(2) The resources would remain available to help satisfy the predicted increase in the demand for whitewater boating and river-oriented recreational use in southern Idaho.

(3) Processing would continue on the nomination of the area for National Natural Landmark status, and the potential for further consideration as a Wild and Scenic River would remain.

(4) Incremental growth of recreational demand and possible development of small hydroelectric projects would provide some limited economic benefits for the local area.

5.2 MITIGATIVE MEASURES RECOMMENDED BY AGENCIES AND STAFF

5.2.1 A.J. Wiley Project--Proposed Action

5.2.1.1 Vegetation

The U.S. Fish and Wildlife Service (FWS) and the Idaho Department of Fish and Game (IDFG) considered the vegetation mitigative plan as proposed by the Applicant to be inadequate. Their major concerns are: (1) that every acre of woody riparian vegetation lost be replaced in kind, either on or off-site; this may require approximately 1.25 acres of mitigative area to replace 1 acre of woody riparian vegetation, in order to make up for lost diversity; (2) that special efforts be made to reestablish hackberry and water birch; (3) that fluctuating reservoir levels may adversely affect the success of the planting program; (4) that the plantings be watered and monitored until successful establishment occurs; (5) that mitigation for lost grass-shrub habitat be provided; and (6) that successful establishment be defined as the vegetation in the total number of agreed-upon mitigative acres. Details of the FWS and IDFG mitigative program and the Applicant's comments on the plan are listed in Appendix C.

After analyzing agency, Applicant, and citizen concerns and reviewing the application, mitigative plans, and comments, Staff makes the following recommendations concerning a vegetation mitigative plan:

(1) An on-the-ground survey should be conducted before construction begins to determine the exact number of acres of wetland, herbaceous riparian, and woody riparian vegetation that would be impacted by project construction and operation.

(2) A study of the woody riparian areas should be conducted to determine frequency, density, and dominance of the vegetation species present, and a replanting scheme should be developed that will match the lost species composition as closely as possible, especially for hackberry and native birch areas.

(3) The goal of the mitigative plan for these areas should be to match the structural and functional relationships of the natural habitat as closely as possible.

(4) Wetland, herbaceous riparian, and woody riparian vegetation should be replaced on the basis of at least 1 acre replaced for each acre lost. The studies recommended in items 1 and 2 may be used as a basis for replacement.

(5) The Applicant's mitigative program should be changed from a concept of nine "island" areas to one providing a more continuous strip of vegetation around the proposed reservoir. This would more closely simulate present conditions and would provide better wildlife habitat. Changing the mitigative program may necessitate additional grading around the reservoir edge, the addition of appropriate top soil in some areas, and the installation of an irrigation system.

(6) A pilot vegetation reestablishment program should be started during construction to determine the success of vegetation methods proposed.

(7) A revised mitigative plan should be formulated by the Applicant in consultation and cooperation with the IDFG, FWS, and BLM, to address the concerns expressed in the FWS-IDFG mitigative plan in Appendix C. Goals of the mitigative program, detailed methods to be used, species to be utilized, establishment

of a monitoring system, and contingency plans if revegetation efforts do not meet agreed-upon goals, should be negotiated between the Applicant and the agencies.

(8) Before reservoir filling starts, consideration should be given to using plants that would be inundated as seed or stock sources if the plants are not readily available from nurseries.

(9) Design of project features such as dikes should be revised as appropriate to decrease the adverse impacts of fluctuating reservoir water levels.

10) Applicant should collect seed of the plant species Astragalus purshii var. ophiogenes from the Wiley Reach population and should revegetate suitable areas above the proposed water level.

5.2.1.2 Wildlife

Staff does not consider the Applicant's mitigative proposal (Section 4.1.6.2) adequate to mitigate the loss of wildlife and wildlife habitat. The waterfowl enhancement proposal and the nine dispersed mitigative sites do not adequately compensate for the reduction in numbers of the various wildlife species that are associated with the existing quality or quantity of wetland, riparian, and grass-shrub habitats (Section 4.1.6.2). For example, the Applicant states that the mitigation of upland game species is of special concern, but no specific measure to mitigate for the loss is proposed.

Nationally, riparian habitat is decreasing because of land use practices (McCormick, 1980). In Idaho, riparian habitat is uncommon (Section 3.1.4.1), and regionally, in the semiarid areas, is even more restricted. In the last 30 years, the Snake River has been extensively developed, leaving remnants of past riparian communities. The remaining riparian communities such as the Wiley Reach are extremely important to wildlife species (Section 3.1.4.1), and receive disproportionately more use by wildlife than other habitat types. Riparian habitat could be further reduced by the future development of hydroelectric projects along the Snake River. If agriculture continues to expand (Bureau of Land Management, 1980), the number of acres of other wildlife habitat, such as grass-shrub communities, would decline, and would preclude its use by associated wildlife species. For these reasons, Staff concurs with the FWS that the habitat that would be impacted is of high value to wildlife species, and is relatively scarce or becoming scarce both nationally and regionally.

The Applicant's goal should be to replace habitat value losses with similar habitat of equal value. Habitat values and management techniques and responsibilities should be determined by negotiations among the Applicant, IDFG, FWS, BLM, and SCS. An example of a technique that could be used to determine habitat value is the FWS's Habitat Evaluation Procedures.

After analyzing agency, Applicant, and citizen concerns and reviewing the application, mitigative plans, and comments, Staff believes that the following measures should be negotiated among the agencies and the Applicant: (1) specific long-term goals for the number of acres of habitat types to be replaced and numbers of geese to be managed in the Applicant's goose-enhancement proposal; (2) techniques to create, where physically possible, strips or bands of riparian vegetation connecting the proposed mitigative sites; (3) an increase in the size of the proposed mitigative sites by expanding the project boundary; (4) a preconstruction survey of key wildlife species; (5) post-construction monitoring of mitigative measures; (6) contingency plans, such as off-site mitigation, if monitoring indicates that mitigative goals cannot be met; (7) a resolution of the potential conflicts between recreational development and the goose enhancement proposal; (8) specific measures to mitigate for the reduction in the numbers of individual upland game species; (9) a time schedule for the implementation of mitigative measures; and (10) initiation of some mitigative measures, once construction begins.

5.2.1.3 Water Quantity and Quality

The Applicant did not propose a minimum flow release from the proposed project, but indicated that it would be a run-of-the-river facility. Dr. Peter Bowler recommended that a minimum flow be released from the proposed dam and that the dissolved oxygen of the release be maintained at 6.0 mg/l to maintain and enhance downstream fishery resources.

In light of the analysis in Section 4.1.4.1, Staff believes that a continuous minimum flow release from the project is warranted in order to maintain reservoir water quality and promote conditions suitable for any proposed reservoir fishery. Consideration of any continuous minimum flow release must address the need to maintain the reservoir at elevation 2,735 feet and to provide sufficient flow through the reservoir in order to maintain water quality. Staff envisions a continuous minimum flow release from the project of about 6,500 cfs or the inflow to the proposed reservoir, whichever is less. This flow release should be subject of further study and refinement by the Applicant and agencies.

Staff does not believe that the dissolved oxygen levels of the flows released from the proposed project should be maintained at 6.0 mg/l. Staff found that the fishery in Bliss Pool is chiefly a warmwater fishery, and believes that maintenance of the state's dissolved oxygen standard is adequate. Staff notes, however, the Applicant's plan to establish a coldwater fishery in the proposed reservoir, and believes that the dissolved oxygen levels of water released from Lower Salmon Falls Dam combined with diurnal fluctuations due to respiration by phytoplankton and decay of organic matter may affect the production of this fishery during the summer months. According to the most recent draft of EPA's Dissolved Oxygen Criteria Document for Freshwater Aquatic Life (Dr. Gary Chapman, EPA, September 15, 1982, personal communication with FERC staff), salmonid life stages other than eggs and embryos require a DO level of 8.0 mg/l to ensure no production impairment. Slight production impairment would occur to these life stages if minimum DO levels of 6.0 mg/l occur, while levels of 5.0 mg/l would result in moderate production impairment. Thus, DO levels in water discharged from Lower Salmon Falls Dam (currently required to be at least 5.0 mg/l) may need to be increased, depending on the level of production desired in the proposed reservoir. Staff also notes that, in the same document, DO levels for embryo and larval stages of non-salmonids must be at least 7.0 mg/l for no production impairment, 6.0 mg/l for slight, and 5.0 mg/l for moderate production impairment. For other life stages of non-salmonids, similar levels of production would occur at minimum DO levels of 6.0, 5.0, and 4.0 mg/l, respectively. Staff believes that, following a clarification of fishery goals and objectives (see Section 5.2.1.4), a determination could be made concerning what minimum levels of DO should be required in the discharge from Lower Salmon Falls Dam. Higher dissolved oxygen levels could be maintained, if warranted, with aeration techniques developed by the Applicant or with hub baffles that have been evaluated by the Tennessee Valley Authority (1980).

5.2.1.4 Fisheries and Aquatic Communities

The FWS and IDFG jointly recommended mitigative measures to supplement those proposed by the Applicant (Appendix C). These included:

(1) Implementation of state environmental quality control standards and an erosion control monitoring program to include inspection by representatives of state and Federal resource agencies.

(2) Establishment of a self-sustaining warmwater or coldwater fishery, depending on which fishery acclimates to reservoir conditions most successfully. There is uncertainty among biologists as to whether the Wiley Reservoir would be better suited for a warmwater or coldwater fishery. The agencies recommended, therefore, that 100,000 fingerlings each of black crappie and smallmouth bass be stocked in the proposed Wiley Reservoir, in addition to the trout stocking proposed by the Applicant. The agencies also proposed a monitoring program to evaluate the

fish-stocking program and the preference and effort of anglers utilizing the proposed reservoir fishery. If the sport fish populations do not become self-sustaining as determined by the evaluation program, the agencies recommended a long-term stocking program for a put-and-take fishery.

(3) Development of reservoir shoreline and bottom to improve fish habitat. The agencies recommended that fish shelters be constructed in the reservoir to provide habitat diversity in terms of fish cover and food-producing substrate. These structures would be in addition to inundated natural vegetation that would be left in submerged areas. While the agencies did not object to the placement of spawning gravel in the Malad River, they did question the permanence and ultimate potential success of such a measure.

(4) Protection of a portion of the remaining Shoshone sculpin habitat through the acquisition of a spring.

Additional mitigative measures for reducing the project's impacts on Shoshone sculpin, white sturgeon, and fish passing through the turbines were recommended by Dr. Peter A. Bowler. (See Appendix F.) In general, the recommendations to protect Shoshone sculpin include consideration of the purchase and preservation of Box Canyon and at least one spring in the Wiley Reach, the stocking of Shoshone sculpin in tributaries and springs within its historic distribution, the hatchery propagation of Shoshone sculpin for stocking, the ongoing review and reporting of the status of existing populations, and the success of attempts to reestablish the species in other locations.

Recommendations for enhancing the white sturgeon population included: (1) hatchery propagation for stocking the remaining habitat in the Snake River between Shoshone Falls and C.J. Strike Dam in order to increase populations to self-sustaining size; (2) relocation of the population in the Wiley Reach to areas of suitable habitat; (3) evaluation of the feasibility of designing and constructing spawning habitat for white sturgeon remaining where there is poor spawning habitat; and (4) an ongoing monitoring program to review, and report the status of these populations and the success of enhancement efforts. In addition, Dr. Bowler recommended a 3-year study of mortality of fish passage through the turbines of the Wiley Project and at Bliss Dam in order to identify levels of stocking needed to offset this impact on downstream populations.

Staff generally concurs with the recommended mitigative measures put forth by the FWS and IDFG. Recognizing the uncertainty concerning whether a coldwater or warmwater fishery could become established in the proposed reservoir, Staff supports stocking species that occur in both types of fisheries and monitoring the populations in order to determine which species are best suited to the new reservoir conditions. The plan recommended by the agencies should be modified to clearly state the goals of the program and to provide the flexibility needed to achieve those goals. The loss of fish from the impoundment through the turbines or the spillway should be considered when determining the number of each species to be stocked. In addition, the need to install certain devices at the Lower Salmon Falls Dam to maintain dissolved oxygen levels suitable for a coldwater reservoir fishery should be considered.

The reservoir environment can be expected to change through time as the influx of organic material to the system declines after the initial filling of the reservoir. Therefore, it would not be possible to determine in 2 to 3 years what species would be best adapted for conditions that would exist during 45 to 50 years of project operation. Monitoring of the reservoir fishery must be viewed as an on-going program to assure that the species best suited to the Wiley Reservoir are stocked. Thus, the Applicant should be prepared to provide a put-and-take fishery in the proposed reservoir until a self-sustaining fishery is established, or indefinitely, if it is determined that such a fishery could not become established in this reach.

Successful utilization of any spawning gravel placed at the mouth of the Malad River cannot be predicted with any certainty. Therefore, the experimental nature of this proposal requires that beneficial effects of this mitigative measure not be counted until its benefits are demonstrated.

Banbury Springs, located at river mile 589.3, has been identified as an area where Shoshone scuplin habitat could be preserved. Shoshone scuplin occur in this spring and in Lake Morgan, an adjacent manmade impoundment, in relatively high frequency (Griffith, et al., 1981). The Applicant owns the land surrounding Banbury Springs, including Lake Morgan; priority to the water rights, however, is held by another party. As a result of continuing negotiations, Applicant believes itself to be in a position to purchase the rights once they are granted by Idaho Department of Water Resources. Applicant would then take the necessary action to ensure preservation of the springs for Shoshone sculpin. Staff supports these efforts. If they do not bear fruit, however, Staff recommends that Applicant consider the recommendations of Dr. Bowler to develop a plan to lessen the project's impacts on the Shoshone sculpin.

Dr. Dwight W. Taylor recommended that the Bliss Rapids snail be transplanted to Box Springs Canyon or to a stream fed by large springs upstream in the Snake River drainage. He also recommended that the success of any transplant efforts be monitored.

With regard to the Snake River Physa snail, there may be no suitable habitat for the establishment of colonies outside the present range in the Snake River drainage. Therefore, any transplanting efforts would have to be directed to be directed to the Salmon, Pend Oreille, or Spokane Rivers with specimens that are propagated in aquaria. Staff believes that the Applicant and agencies should consider these recommendations and incorporate them into a mitigative plan.

5.2.1.5 Geology

Staff believes that a subsurface cut-off should be constructed to prevent seepage from the reservoir through permeable materials in the right abutment and beneath the dam. Suitable design measures and construction techniques are available whereby significant leakage could be effectively prevented. Typically, design problems of this nature are addressed by a Board of Independent Consultants to ensure the safety of the project.

Staff also believes that reservoir-induced landsliding and subsequent erosion at the inundated toe of the Bliss landslide and other slide areas could be controlled by suitable initial slope treatment, drainage control, revegetation, and monitoring maintenance programs. Other slope treatment, drainage control, revegetation, and monitoring and maintenance programs that could be implemented should help to reduce project-induced landsliding and erosion to a relatively insignificant level.

The Applicant has not yet proposed the specific measures that would be used for control of erosion and slope stability at the project, however. The exact location and nature of all of the potential slide areas are not yet known sufficiently for the final design and implementation of adequate control measures.

Staff recommends that, if a license is issued, the Applicant should prepare a detailed plan to control soil erosion, dust, and slope stability, and to minimize the quantity of inorganic sediment and other water pollutants resulting from construction and operation of the project, including the reservoir shoreline (elevation 2,735 feet). The plan should provide for maintenance and repair of any road and bridge damage that would result from construction activities and project operation. The plan should provide for detailed investigation of the reservoir shoreline to identify problem areas and for design and implementation of suitable treatment prior to filling the reservoir. The plan should include an implementation schedule and also provide for monitoring to identify erosion and slope stability problems that may develop in the future and for treatment of the problems.

A monitoring program should be prepared for the Applicant's proposed drainage system at the dam; all drainage should pass through monitoring weirs.

5.2.1.6 Recreation

The Applicant's proposal to provide reservoir-oriented recreational opportunities should be considered as a development of opportunities that would be provided by the project and not as mitigation for the loss of river-oriented recreational uses. Recreationists would have to travel longer distances and incur higher costs to experience river recreation comparable to that found in the Wiley Reach.

There does not appear to be any practicable means to mitigate for the loss of whitewater boating. Some of the recreational values, as well as some of the scientific, scenic, and ecological values present along the Wiley Reach, however, can be found to a lesser degree at two other significant sites in the vicinity of the proposed project. The Malad Canyon and the Box Canyon sites have also been nominated for National Natural Landmark status. Both sites were included on the FWS list of important fish and wildlife habitats in Idaho: Malad Canyon was co-ranked sixth with the Wiley Reach; Box Canyon was ranked third. The Malad Canyon is contiguous with the Wiley Reach, and the lower section of the Malad River would be impacted by construction of the A.J. Wiley Project. The upper part of the canyon is included in the Malad Gorge State Park. Of the remainder of the canyon, a significant portion is owned by the Applicant, and is mostly included in the Upper and Lower Malad Project, FERC No. 2726. Box Canyon is located on the Snake River, about 6 miles upstream of the Upper Salmon Falls Dam, which is licensed to the Applicant as part of FERC Project No. 2777. The ecological integrity of both the Malad Canyon and Box Canyon sites is being challenged by various proposals for water diversions, fish hatcheries, or other development schemes. The combined loss of the recreational values and other natural values represented by Malad Canyon, Box Canyon, and the Wiley Reach would mean a significant loss of ecological diversity and human values in the area.

Staff believes that the Applicant should consult with the U.S. Department of the Interior and the Idaho Departments of Fish and Game and Parks and Recreation concerning protection of Malad Canyon and Box Canyon as partial mitigation for the loss of existing recreational and natural resource values at the proposed project.

5.2.1.7 Cultural Resources

Staff and the SHPO concur that the Applicant's cultural resources management plan for sites 10GG1 and 10TF352 would be adequate to mitigate adverse impacts to these sites from the proposed project.

The Applicant should file the following information for FERC and SHPO review: (1) an archeological report on the unsurveyed island in the Wiley Reach; (2) documentation to establish the eligibility of sites 10GG188, 10GG189, 10TF455, and any sites inventoried on the survey of the island in the Wiley Reach for the National Register of Historic Places; and (3) a cultural resources management plan for avoiding or mitigating impacts to any of these sites that appear eligible for the National Register. The Applicant should also request the SHPO to forward his comments to the FERC concerning the adequacy of the report, documentation, and plan. This information would be necessary for Staff to consult with the Advisory Council on Historic Preservation about the effect of the project upon these properties.

5.2.1.8 Socioeconomic Factors

Staff recommends that the Applicant establish a relocation advisory service and provide reasonable financial assistance to those persons who must relocate. The same reasonable financial assistance should be provided to any business enterprises forced to discontinue their operations because of the proposed project.

5.2.2 Bliss Bridge Damsite--Alternative 1

Mitigative measures previously discussed for vegetational, wildlife, fisheries, water quality, recreational, and socioeconomic factors are applicable to the Bliss Bridge alternative. Sections 5.2.2.1 and 5.2.2.2 discuss additional measures required or other findings.

5.2.2.1 Geology

Preliminary investigation of the Bliss Bridge site indicated that no serious foundation problems exist that would require extensive remedial measures. (See Sections 3.2.1 and 4.2.1.)

5.2.2.2 Cultural Resources

Staff believes that the program of salvage excavation for archeological site 10TF352 in the proposed cultural resources management plan would be appropriate to mitigate adverse impacts to the site from construction of the Bliss Bridge alternative. Impacts to site 10GG1 may not be the same as for the proposed project, and may possibly require different mitigative measures. An investigation would be required to determine the nature of impacts to 10GG1 from the project and appropriate mitigative measures.

If the Bliss Bridge alternative is recommended for licensing, the Applicant would be requested to file for

FERC and SHPO review: (1) the results of an investigation to determine the nature of project impacts to site 10GGl; and (2) a cultural resource management plan for avoiding or mitigating impacts to 10GGl based on the results of this investigation. Any plan to preserve and protect 10GGl should contain contingencies to conduct salvage excavations at the site in the event it is threatened with impact, vandalized, or otherwise impacted as a result of construction and operation of the project. As in the proposed project, this information would be required to to allow Staff to consult with the Advisory Council on Historic Preservation.

5.2.3 Coal-fired, Steam-electric Project--Alternative 2

5.2.3.1 Socioeconomic Factors

The Applicant probably would have to provide on-site housing and to subsidize the development of community services in order to minimize the impacts of a large construction force on the local economy.

5.2.3.2 Air Quality

The Applicant would be required by the EPA to maintain the ambient levels of regulated air pollutants, such as nitrous oxides, sulfur oxides, and particulates, within limits determined to be safe. This requirement should also reduce the emission of nonregulated pollutants, although the impacts associated with these emissions are not well understood.

5.2.3.3 Water Quality

It is probable that the state water quality agency would require that the disposal of process wastes and solid by-products from the coal-fired plant be handled so as to minimize the potential adverse impact to surface water or groundwater. Mitigative measures recommended by the Staff include the lining of waste ponds with impermeable materials and the installation of a groundwater monitoring network to ensure the integrity of the liner.

5.3 UNMITIGATABLE ENVIRONMENTAL IMPACTS

5.3.1 A.J. Wiley Project--Proposed Action

Unmitigatable environmental impacts include the loss of 8 miles of free-flowing river and associated habitat for fish and benthic organisms. Eutrophication in the reach would not increase, although algal blooms may characterize the proposed reservoir during the summer.

Rearing habitat for white sturgeon would be reduced or eliminated.

The project would also eliminate whitewater boating, river fishing, and other river appreciation uses from this reach of the Snake River. Thus, the only large river resource in a 20-mile reach of the Snake River extending from the Upper Salmon Falls Reservoir to Bliss Dam would be eliminated by the proposed action.

Recreationists who currently use the Wiley Reach of the Snake River would have to pay higher gasoline costs and travel costs to experience similar river-related activities. Individuals forced to relocate residences and reestablish businesses may be affected by the high purchase price of property and high interest rates. Business income may be lost during the time taken to reestablish businesses.

Approximately 800 acres of land, including 31 acres of agricultural land and the equivalent of 50 AU per month of grazing, would be lost.

The Wiley Reach would no longer be eligible for possible Wild and Scenic River and the National Natural Landmark status.

5.3.2 Bliss Bridge Damsite--Alternative 1

The unmitigatable environmental impacts are generally similar to those of the proposed A.J. Wiley Project.

5.3.3 Coal-fired, Steam-electric Project--Alternative 2

Adherence to air quality standards established by the EPA does not totally mitigate for the impacts associated with the long-range transport of pollutants that are associated with the problem of acid precipitation, and does not address the emission of complex organic compounds or trace elements. In addition, significant increases in suspended particulates could occur as far as 20 miles from the mine site.

5.4 CONCLUSIONS

Staff's analysis of the Applicant's proposed A.J. Wiley Project, the Bliss Bridge damsite alternative, and the comparably sized portion of a coal-fired, steam-electric plant alternative, indicates that each would contribute about 70.5 MW of dependable capacity to the Applicant's service area, but would not eliminate system reserve capacity deficits or the need for additional capacity.

In 1987, the proposed project or an alternative would contribute 2.5 and 2.3 percent of the required summer peak load and reserve requirements under a 2.7 and a 4.0 percent load growth-rate scenario, respectively. Therefore, large-scale development of the hydroelectric potential in the Wiley Reach would defer the need for additional dependable capacity by almost 1 year under a 2.7 percent growth-rate scenario and by one-half year, assuming a 4.0 percent annual rate of growth.

During average streamflow years, surpluses in annual energy occur in every year of the 1986-1991 planning period; the energy provided by the proposed project or alternatives would not be needed under any of the energy growth-rate scenarios studied.

Assuming a worst-case combination of both adverse streamflow and adverse weather conditions, Staff believes that energy deficits would occur under the higher energy growth-rate scenarios of 3.5 and 4.0 percent annually. Staff's analysis of the Applicant's system energy resources under adverse streamflow conditions and average weather conditions showed energy deficits ranging between 195 and 836 GWh after 1989. The proposed project or the Bliss Bridge alternative would provide approximately 355 GWh of energy annually during adverse steamflow years, and would reduce the deficit in 1990; a comparably sized portion of a coal-fired plant would provide 485 GWh of energy annually.

Staff's economic analysis assumed worst-case geological conditions and included costs to correct geological problems and build a safe project at the proposed A.J. Wiley damsite. Based on the assumptions of worst-case conditions, the proposed project and alternatives were found to be economically feasible.

The Bliss Bridge alternative would develop 96.3 percent of the available head in the Wiley Reach of the Snake River, cost less to construct, and avoid most of the potential geological problems concerning seepage under the dam encountered at the A.J. Wiley Damsite. Staff's revised economic analysis indicates that the Bliss Bridge alternative would result in an additional saving of $1.04 million annually over the proposed A.J. Wiley Project for a 50-year period. (See Table 1-9.) In addition, the environmental impacts of the Bliss Bridge alternative would be slightly but not significantly reduced. Over a 50-year period, the coal-fired plant would cost about $13.9 and 12.9 million more per year to operate than the Bliss Bridge alternative and the proposed A.J. Wiley Project, respectively. This difference in operating costs between the coal-fired plant and hydroelectric projects is due primarily to escalation of the cost of coal. The coal-fired plant would use known domestic coal reserves and would not use imported fuel.

The Snake River in Idaho has been extensively developed for irrigation and electrical energy, especially in the past 30 years. The large-scale hydroelectric development of the Wiley

Reach would result in the loss of one of the last significant remnants of the free-flowing Snake River in the Upper Snake River basin. (See Sections 3.1.4.1, 3.1.6.2., and 4.1.4.1.) The relatively undeveloped Wiley Reach provides ecological, cultural, and recreational benefits that are scarce or unique regionally, and may be of national significance. (See Sections 4.6.2 and 4.6.3.) In addition to a rare and unique riparian flora and the associated diversity of wildlife, the free-flowing Wiley Reach supports aquatic resources and organisms that are limited in their distribution in south-central Idaho. Recreational use of the Wiley Reach (primarily by local residents), as indicated by an estimated 4,965 trips between May 15 and October 2, 1981, would be displaced to comparable areas nearly 150 miles distant, if the reach were developed. Since additional power projects on the Snake River are under consideration and would likely be developed, the values that characterize the Wiley Reach would become more important in future years. Thus, the construction and operation of the proposed project or the Bliss Bridge alternative would eliminate the only large river resource in a 20-mile reach extending from the Upper Salmon Falls Reservoir to Bliss Dam. (See Figure 4-3.)

In contrast, the coal-fired plant site consists chiefly of rangeland and agricultural land. The predominant vegetation type of the rangeland is sagebrush-steppe, which provides habitat for small and medium-sized mammals and also provides hunting and offroad recreation vehicle use. Crops produced in the area include potatoes, corn, and wheat. Visual resources of the area have little definition and less variety than the Wiley Reach. The air quality at the site has been categorized as Class II-intermediate, although Craters of the Moon Monument and the Sawtooth Mountains Wilderness, located between 50 and 75 miles east of the proposed coal plant, are Class I areas with excellent air quality. Staff concludes that the environmental resources that characterize the Wiley Reach of the Snake River are of higher quality than those found at the coal-fired plant site, with the exception of the air quality.

The coal-fired, steam-electric plant alternative is the only alternative analyzed that would have the potential to be expanded to meet electrical energy needs for more than 1 year. A single 250-MW unit would supply enough energy to defer the need for additional resources by several years. Barring any limitations caused by transmission facilities or environmental restrictions, additional units could be added to a coal plant as needed. The selection of this alternative would result in increased generation capacity and the retention of the environmental resources and values of the Wiley Reach. Compared to a hydroelectric plant, however, a coal-fired, steam-electric plant would cost more to operate, would utilize a nonrenewable resource, and would have potential long-term impacts on air and water quality, both in the immediate vicinity of the plant, and over a large area. (See Section 4.3.1.) The air and water quality problems would be subject to possible future improvements in technology.

Staff believes that there are advantages and disadvantages to the proposed action and alternatives. The proposed A.J. Wiley Project, while economically feasible and less costly than a coal-fired plant, would cost more to operate than the Bliss Bridge alternative. While hydroelectric development provides capacity, the energy produced would vary with streamflow and weather conditions. Although the latter two hydroelectric projects are more economical to operate and would provide for the complete development of the hydropower potential in the 20-mile reach of the Snake River between Upper Salmon Fails Reservoir and Bliss Dam, the selection of either would require the irretrievable and irreversible commitment of the only large non-reservoir resource in this river reach. Construction of the A.J. Wiley Project or the Bliss Bridge alternative would delay the need for a large energy-producing plant like the coal-fired, steam plant alternative for as much as 1 year.

Unlike the hydroelectric projects, the energy production of a coal plant is not dependent on streamflow conditions; thus, the benefits of a coal-fired plant over a hydroelectric project during adverse streamflow years are obvious in terms of energy production. Hydroelectric powerplants, however, have many distinct advantages over thermal plants. Unscheduled outages are less frequent, and downtime for overhaul is of short duration, because hydroelectric machinery operates at relatively low speeds and temperatures, and is relatively simple. The ability to start quickly and make rapid changes in power output makes hydroelectric plants particularly suitable for carrying peakloads and for assisting in the supply of spinning reserve. Environmentally, a coal-fired plant would affect air quality and put pressure on community services and lifestyles during and after construction; it would allow the continued use of the only non-reservoir resource in the 20-mile reach of the Snake River between Upper Salmon Falls Reservoir and Bliss Dam.

The no-action alternative shifts the burden of providing electrical power to nonhydroelectric facilities, such as a coal-fired plant. Staff's analysis of other structural alternatives found them wanting in terms of providing dependable capacity and firm energy to the system over a period of at least 35 years, or not economically and environmentally feasible. Staff also viewed conservation as an adjunct to any project and not as a substitute to the proposed project. Staff believes that conservation has and will continue to play an important role in the service area, and will delay the need for additional generating resources, but will not eliminate the need in the future.

The coal-fired plant alternative, not now proposed for development, would adversely affect resources that are abundant and are of limited value in terms of recreation, scenic values, vegetation, wildlife habitat, and fishery resources. The coal-fired plant's greatest impact would be on the air quality of the immediate and adjacent areas. At this time, there are no coal-fired plants operating in Idaho, i.e., the air quality for the most part is good and is not being stressed by stack emissions.

In conclusion, with the exception of air quality, the coal-fired, steam-electric plant alternative would adversely impact resources that are abundant and generally of lower quality than those found at the Wiley Reach of the Snake River. In contrast, the proposed project or the Bliss Bridge alternative would adversely affect resources found in the Wiley Reach that are very limited and are of high value in terms of recreation, vegetation, wildlife habitat, scenic values, and fishery resources.

Of the options for large scale hydropower development of the 20-mile reach of the Snake River between Upper Salmon Falls Reservoir and Bliss Dam, Staff prefers the Bliss Bridge alternative and the accompanying mitigative measures outlined in Section 5.2, rather than the proposed A.J. Wiley Project.

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Department of the Army, Corps of Engineers
Department of Commerce
Department of Health and Human Services
Department of the Interior
Department of Transportation
Environmental Protection Agency

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9. APPENDICES

A. Factors Considered in the 1981 Base Case Peak Forecast Probability Analysis (February) and the Loads Resources 1982-2001 (October) report.

B. Significant Geological Events

C. Riparian Vegetation, Species List, Agency Mitigative Plan, and Applicant's Response

D. Form L-2: Terms and Conditions of License for Unconstructed Major Project Affecting Lands of the United States

E. Federal Power Commission (now Federal Energy Regulatory Commission) Order 415-C (compliance with the National Environmental Policy Act); Federal Energy Regulatory Commission Rules of Practices and Procedures, 18 CFR 1.8, Intervention

F. Letters of Comment on the Draft Environmental Impact Statement.

Appendix A

Factors Considered in the 1981 Base Case Peak Forecast Probability Analysis (February) and the Loads and Resources 1982-2001 Report (October)

1981 Base Case Peak Forecast Probability Analysis (February)

Population

The Residential Customer Forecast is based on the population forecast for the IPCO Service Area. The population forecast, which is a modified version of the Idaho Department of Water Resources and Boise State University model, shows an average annual growth rate of 2.3% for the IPCO Service Area for the 1980-2001 period.

Employment

The basic input to the population forecast is an employment forecast by economic sector. This forecast shows an annual increase of 2.47% between 1980 and 2000 in the number of jobs in the IPCO counties. This forecast assumes continued growth in service area employment based on relatively strong regional economic growth reflecting the competitive climate for economic growth in Idaho.

Residential Sales

The Residential forecast is based on an econometric analysis of customers and use per customer. The customer forecast shows an average annual growth rate of 3.3% or roughly 9600 additional customers each year. The customer forecast reflects declining population per household with 2.6 persons per customer in 1980 to 2.2 persons per customer in 2001.

The use per customer number is forecasted via regression analysis utilizing variables for income per capita, electricity prices, natural gas prices, electric space heating saturation, heating and cooling degree days and seasonal variables. The electric space heating saturation is forecast in a separate equation. Company-sponsored conservation programs have been analyzed via the Residential End-Use Model and are incorporated in the forecast. Residential sales are projected to grow at an average annual rate of 5.1% for 1981-2001 compared to the weather adjusted historical rate of 8.6% for 1967-80.

Commercial

Commercial consists of small commercial customers and large commercial customers (Schedules C19 and J R Simplot Company). Small commercial and C19 are forecast on a total sales basis using separate regressions. Simplot is forecasted via non-statistical methods. Commercial sales are projected to grow at an average annual rate of 4.3% for 1981-2001 compared to the weather adjusted historical rate of 7.2% for 1967-80.

Irrigation

The Irrigation forecast is based on regression analysis. A forecast of acres from the State Water Plan is used in the regression. The forecast for 1981-2001 has an annual average growth rate of 1.6% compared to the historical weather adjusted rate of 7.3% for 1967-80.

Industrial Sales

ERDA is assumed to gradually increase to its contract demand of 40 MW and continue at that level through the rest of the forecast period. FMC is assumed to operate at its current level. The forecast for Monsanto assumes that it will no longer be a customer of Idaho Power after 1985.

Firm Resale

The projection of the CP National customers, Burns, Baker, and Elko, is made by CP National itself. The projection for Weiser is based on an historical analysis of growth in relation to total IPCO system growth.

Losses

A revised study of system losses resulted in an annual loss factor of 9.5% of total sales.

Loads and Resources 1982-2001 Report (October)

POPULATION

The Residential Customer Forecast is based on the population forecast for the IPCo Service Area. The population forecast, which is a modified version of the Idaho Department of Water Resources and Boise State University model, shows an average annual growth rate of 2.2% for the IPCo Service Area for the 1981-2002 period.

EMPLOYMENT

The basic input to the population forecast is an employment forecast by economic sector. This forecast shows an annual increase of 2.5% between 1981 and 2001 in the number of jobs in the IPCo counties. This forecast assumes continued growth in service area employment based on a relatively strong regional economy reflecting the competitive climate for economic growth in Idaho. The strongest growth is projected in the other manufacturing sectors (electronics, light manufacturing industries), while little growth is expected in the Lumber and Wood Products industries.

RESIDENTIAL SALES

The Residential Forecast is based on an econometric analysis of customers and use per customer. The customer forecast for 1981-2002 shows an average annual growth rate of 3.0% or roughly 8700 additional customers each year.

The use per customer estimate is based on an analysis utilizing variables for income per capita, electricity prices, natural gas prices, electric space heating saturation, heating and cooling degree days and seasonal variables. The electric space heating saturation is forecast in a separate equation. Company-sponsored conservation programs have been incorporated in the forecast. Residential sales are projected to grow at an average annual rate of 3.7% for 1981-2002 compared to the weather adjusted historical rate of 8.6% for 1967-1080.

SMALL COMMERCIAL

Small Commercial consists of schedules 11, 12, 13, 15, 41, 25, 33 and 46. Small Commercial Sales are based on an analysis relating energy sales to electric prices, natural gas prices, population and aggregate economic conditions and are projected to grow at an average annual rate of 3.3% for 1981-2002 compared to the weather adjusted historical rate of 6.1% for 1967-1980.

LARGE COMMERCIAL

Large Commercial Sales include Schedule 19 and the J. R. Simplot Company plant near Pocatello. The Schedule 19 forecast is based on an analysis relating energy sales to electric prices, natural gas prices, and aggregate economic conditions and shows 1981-2002 growth to be 3.8% compared to the 1967-1980 growth of 8.9%.

IRRIGATION

The Irrigation forecast is based on an analysis relating energy sales to forecasted acreage, a measure of horsepower intensity, temperature, precipitation, and real electric price. A forecast of acres from the State Water Plan is used in the regression. The forecast for 1981-2002 has an annual average growth rate of 1.3% compared to the historical weather adjusted rate of 7.3% for 1967-1980.

CHEMICAL

ERDA is assumed to gradually increase to its contract demand of 40 MW and continue at that level through the rest of the forecast period. FMC is assumed to operate at its current level with an assumed 72-day maintenance period each year. The forecast for Monsanto assumes that it will no longer be a customer of Idaho Power after 1985 when its contract expires.

FIRM RESALE

The projection of the CP National sales forecast for Burns and Baker was provided by CP National. The Elko projection is held at the current level reflecting contractual transmission limitations. The projection for Weiser is based on an historical analysis of growth in relation to IPCo Residential and Commercial system growth. The 1981-2002 forecast growth at 2.4%/year compares to the historical 1967-1980 growth of 6.6%.

CONSERVATION

The second major area of discussion in the forecast of electricity sales for the IPCo system is the issue of "Conservation." The problems in this area consist of a proper workable definition of conservation, the distinction between price and non-price conservation, the measurement, analysis, and magnitude of Company-sponsored conservation programs in relation to the forecast of electricity demand, the impact of the Pacific Northwest Act, and the question of technological advances in energy saving devices, i.e. solar, photovoltaics, etc.

Conservation is any process that reduces the overall use of energy. Using this definition, a consumer with an electrically heated home is not performing conservation by switching to gas heat, although from the point of view of an electricity supplier lower sales result and therefore conservation is taking place.

Another aspect of the difficulty of conservation measurement is the distinction between price induced and non-price induced conservation. Price induced conservation is simply a demonstration of the laws of supply and demand, which state that as the price of a good rises less of it will be demanded. For example, consumers reduce their appliance usage or convert to systems that are more energy efficient. Non-price conservation is conservation by consumers for some reason other than price and the normal market mechanisms. Examples are the "patriotic" conservation during the Arab oil embargo and public appeals made during times of electricity supply shortages. Related to both price and non-price conservation are various agency sponsored programs (utility or governmental) that operate via incentives or subsidies, (i.e. some process that circumvents the normal workings of the market) which may have price serve as a catalyst for their implementation but would be delayed until a later time frame if not for the additional financial incentive.

Another consideration in developing the forecast is reconciling programmatic conservation and pure price-induced conservation. Given the expectation of higher real (inflation adjusted) electric prices for the IPCo system, and given the fact that consumers respond to higher prices by reducing consumption, some or all of the programmatic conservation that occurs in 1981, for example, would have eventually taken place via the consumer response to higher prices. An argument can be made that non-price conservation simply moves future price conservation into the system up to some earlier date assuming the real price increases in the forecast period. If the subsidies/incentives of these programs are great enough in magnitude then it is possible to argue that the total amount of conservation in the forecast is greater than that which would have occurred simply via the price mechanism. But the forecast must still be adjusted to avoid the "double-counting" of both price and programmatic conservation. This uncertainty can never be completely eliminated and exists in the areas of program measurement/effectiveness, the magnitude of subsidies/incentives, and the responsiveness of consumers to changes in electric prices.

An accurate appraisal of the impact of conservation depends on future economic/political decisions as well as a determination of the value of the programs themselves. The political process can add uncertainty via mandatory (non-price) conservation standards applied to building codes, appliance efficiency standards, electric space heat moratoriums, etc. Incorporating the estimates of programmatic, or non-price, conservation requires estimates of both the penetration (the number of customers who adopt the program) and the savings per customer or appliance associated with the program. Data on market penetration and potential for conservation is becoming available through surveys such as those conducted by PNUCC and Idaho Power. However, there is a lack of current and historical data relating to program savings because of the wide diversity of housing and appliance types and sizes. Therefore, until more comprehensive end use data and analyses are developed, judgement must often be substituted. An approach that relies solely on judgement must carefully consider all existing data, the socio-economic factors, and knowledge of customer attitudes, characteristics and composition. Engineering studies are often used to provide savings estimates based on controlled experiment conditions. These studies often ignore the behavioral response by consumers to programmatic conservation. Consumers may respond to conservation programs by using appliances more intensively, i.e., raising their thermostat (comfort level) after a conservation program has weatherized their dwelling. Actual conservation savings therefore may be less than the savings projected by engineering studies.

Finally, in estimating conservation the approach most often used is estimating known and potential programs given the current scheme of technological knowledge. It is worth pointing out that various types of technological breakthroughs can significantly alter the future use of electricity. Though it is difficult to forecast these unknowns, one must consider the possibility of more efficient solar systems, cost effective photovoltaic systems, etc. when forming expectations about the future.

In this forecast, conservation is forecast via price and non-price (programmatic) methods. Electric price variables are included in each appropriate category to reflect the amount of price conservation. Known and approved IPCo-sponsored programs are also included in the forecast but are adjusted for the impact of price conservation to avoid double counting. The specific resolution of price versus non-price conservation is done by comparing the amount of price conservation (via elasticities and price forecasts) by year to the projected amount of programmatic conservation. If programmatic conservation is greater than price conservation, the difference is subtracted from the sales forecast, otherwise, no additional adjustments are made. Estimates of IPCo conservation programs that may take place in the long-term ~~are not specifically~~ included in this forecast. The amount of conservation from these yet undeveloped programs is included implicitly in the forecast of price conservation. However, due to the uncertainty associated with price induced conservation, company sponsored programs will be required to assure that conservation is achieved.

Table 1. Total requirements to meet summer peak load and available system resources from 1981 to 1991, assuming an average annual load growth rate of 2.7 percent. 1/

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Load (MW) Summer peak requirements	2,360	2,429	2,500	2,572	2,646	2,723	2,801	2,881	2,964	3,049	3,136
Existing system 2/ capacity (MW)	2,009	2,009	2,009	2,009	2,009	2,009	2,009	1,874	1,874	1,874	1,874
Additions: 1/											
Valmy #1	-	125	125	125	125	125	125	125	125	125	125
Combustion turbine			217	217	217	217	217	217	217	217	217
Cascade			0	0	0	0	0	0	0	0	0
Valmy #2				125	125	125	125	125	125	125	125
Lucky Peak						0	0	0	0	0	0
N. Fork Payette						0	0	0	0	0	0
Dike						60	60	60	60	60	60
Kanaka Rapids						20	20	20	20	20	20
Coal plant #1						125	125	125	125	125	125
Coal plant #2								125	125	125	125
Eagle Rock					5	5	5	5	5	5	5
Swan Falls						10	10	10	10	10	10
Cogeneration and small hydro 3/			3.5	4.5	6.8	5.5	9.8	12.5	14.5	16.5	18.8
Total resources (MW)	2,009	2,134	2,354.5	2,255.5	2,468.8	2,496.5	2,705.8	2,573.5	2,700.5	2,702.5	2,704.8
System surplus (deficit):											
Without A.J. Wiley	(351)	(295)	(145.5)	(316.5)	(177.2)	(226.5)	(95.2)	(307.5)	(263.5)	(346.5)	(431.2)
With A.J. Wiley 4/	-	-	-	-	-	(156)	(24.7)	(237)	(193)	(276)	(360.7)

1/ Hydroelectric capacity used is the dependable capacity taken from Idaho Power Company, 1981a; 1981b, Application; or other applications for license.
2/ Includes existing resources 1980 and purchased power.
3/ Dependable capacity of small hydro is 20 percent installed capacity.
4/ Dependable capacity of A.J. Wiley is 70.5 MW.

Table 2. Idaho Power Company annual energy requirements and system resources available from 1981 to 1991, assuming average streamflow conditions and an average annual load-growth rate of 2.7 percent. 1/

	Average streamflow conditions										
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Annual energy required (GWh)	11,506	11,817	12,136	12,463	12,800	13,145	13,500	13,865	14,239	14,624	15,019
Resources											
Existing resources 1/	12,162	12,162	12,162	12,162	12,162	12,162	11,363	11,363	11,363	11,363	11,363
Additions:											
Valmy #1 (10/81)	219	876 4/	876	876	876	766 2/	766	766	766	766	766
Combustion turbine (6/83)			0 3/	323 5/	323	0	0	0	0	31	323
Cascade (1/84)				49	49	49	49	49	49	49	49
Valmy #2 (6/85)					438	766	766	766	766	766	876
Lucky Peak (6/86)						148	282	282	282	282	282
N.Fork Payette (6/86)						1,234	1,234	1,234	1,234	1,234	1,234
Dike (10/87)							99	395	395	395	395
Kanaka Rapids (1/87)							112	112	112	112	112
Coal plant 1 (1/87)							766	766	766	766	766
Coal plant 2 (1/89)									766	766	766
Eagle Rock (6/85)					98	195	195	195	195	195	195
Swan Falls (7/86)						37	75	75	75	75	75
Cogeneration and small hydro 6/			9	49	79	131	184	237	289	355	420
Total resources (GWh)	12,354	13,038	13,047	13,459	14,024	15,234	15,891	15,944	17,058	17,124	17,189
Energy surplus:(deficit):											
Without A.J. Wiley (6/86)	848	1,221	911	996	1,224	2,089	2,391	2,079	2,819	2,500	2,170
With A.J. Wiley 7/	-	-	-	-	-	2,332	2,876	2,564	3,304	2,985	2,655

1/ Idaho Power Company, 1981a; 1981b, Application.
2/ 70 percent plant factor.
3/ Combustion turbine available, but not used.
4/ 80 percent plant factor.
5/ 17 percent plant factor.
6/ 60 percent plant factor.
7/ Average annual energy of A.J. Wiley Project is 485.4 GWh.

Table 3. Idaho Power Company annual energy requirements and system resources available from 1981 to 1991, assuming average streamflow conditions, assuming an average annual load-growth rate of 2.7 percent. 1/

	Adverse streamflow conditions										
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Annual energy required (GWh)	11,506	11,817	12,136	12,463	12,800	13,145	13,500	13,865	14,239	14,624	15,019
Resources											
Existing resources 1/	11,218	11,218	11,218	11,218	11,218	11,218	10,419	10,419	10,419	10,419	10,419
Additions:											
Valmy #1 (10/81)	219	876 2/	876	876	876	876	876	876	876	876	876
Combustion turbine (6/83)			323 3/	323	323	323	323	323	323	323	323
Cascade (1/84)				36	36	36	36	36	36	36	36
Valmy #2 (6/85)					438	876	876	876	876	876	876
Lucky Peak (6/85)						96	192	192	192	192	192
N. Fork Payette (6/86)						632	790	790	790	790	790
Dike (10/87)							72	289	289	289	289
Kanaka Rapids (1/87)							82	82	82	82	82
Coal plant 1 (1/87)							876	876	876	876	876
Coal plant 2 (1/89)									876	876	876
Eagle Rock (6/86)					78	157	157	157	157	157	157
Swan Falls (6/86)						26	55	55	55	55	55
Cogeneration ans small hydro 4/			9	41	66	109	153	197	240	295	349
Total resources (GWh)	11,437	12,094	12,426	12,494	13,035	14,349	14,907	15,168	16,087	16,142	16,196
Surplus energy (deficit):											
Without A.J. Wiley	(69)	277	290	31	235	1,204	1,407	1,303	1,848	1,518	1,177
With A.J. Wiley	-	-	-	-	-	1,382	1,762	1,658	2,203	1,873	1,532

1/ Idaho Power Company, 1980b; 1981a; 1981b, Application.
2/ Plant factor 80 percent for all coal plants.
3/ 17 percent plant factor.
4/ 50 percent plant factor.
5/ Average annual energy of A.J. Wiley Project under adverse streamflow conditions would be 355.4 GWh.

Table 4. Total requirements to meet summer peak load and available system resources from 1981 to 1991, assuming an average annual load growth rate of 4.0 percent. 1/

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Load (MW) Summer peak requirements	2,360	2,462	2,568	2,677	2,792	2,911	3,035	3,163	3,296	3,436	3,581
Existing system 2/ capacity (MW)	2,009	2,009	2,009	2,009	2,009	2,009	2,009	1,874	1,874	1,874	1,874
Additions: 2/											
Valmy #1	-	125	125	125	125	125	125	125	125	125	125
Combustion turbine			217	217	217	217	217	217	217	217	217
Cascade			0	0	0	0	0	0	0	0	0
Valmy #2				125	125	125	125	125	125	125	125
Lucky Peak						0	0	0	0	0	0
N. Fork Payette						0	0	0	0	0	0
Dike							60	60	60	60	60
Kanaka Rapids							20	20	20	20	20
Coal plant #1							125	125	125	125	125
Coal plant #2									125	125	125
Eagle Rock					5	5	5	5	5	5	5
Swan Falls						10	10	10	10	10	10
Cogeneration and small hydro 3/			3.5	4.5	6.8	5.5	9.8	12.5	14.5	16.5	18.8
Total resources (MW)	2,009	2,134	2,354.5	2,255.5	2,468.8	2,496.8	2,705.8	2,573.5	2,700.5	2,702.5	2,704.8
System surplus (deficit):											
Without A.J. Wiley	(351)	(328)	(213.5)	(421.5)	(323.2)	(414.2)	(329.7)	(589.5)	(595.5)	(733.5)	(876.2)
With A.J. Wiley 4/	-	-	-	-	-	(343.7)	(259.2)	(519)	(525)	(663)	(805.7)

1/ Hydroelectric capacity used is the dependable capacity from Idaho Power Company, 1980b; 1981a; 1981c; or other applications for license.

2/ Includes existing resources 1980 and purchased power.

3/ Dependable capacity of small hydro is 20 percent of installed capacity.

4/ Dependable capacity of A.J. Wiley is 70.5 MW.

Table 5. Idaho Power Company annual energy requirements and system resources available from 1981 to 1991, assuming average streamflow conditions and an average annual load-growth rate of 4.0 percent. 1/

	Average streamflow conditions										
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Annual energy required (GWh)	11,506	11,966	12,445	12,943	13,460	13,999	14,559	15,409	15,747	16,377	17,032
Resources											
Existing resources 1/	12,162	12,162	12,162	12,162	12,162	12,162	11,363	11,363	11,363	11,363	11,363
Additions:											
Valmy #1 (10/81)	192	876 4/	876	876	876	766 2/	766	766	766	766	876
Combustion turbine (6/83)			3/	323 5/	323	0	0	0	0	31	323
Cascade (1/84)				49	49	49	49	49	49	49	49
Valmy #2 (6/85)				438	766	766	766	766	766	766	876
Lucky Peak (6/86)						141	383	282	282	282	282
N. Fork Payette (6/86)						1,234	1,234	1,234	1,234	1,234	1,234
Dike (10/87)							99	395	395	395	395
Kanaka Rapids (1/87)							112	112	112	112	112
Coal plant 1 (1/87)							766	766	766	766	876
Coal plant 2 (1/89)									766	766	876
Eagle Rock (6/85)					98	195	195	195	195	195	195
Swan Falls (7/86)						37	75	75	75	75	75
Small hydro 6/			9	49	79	131	184	237	289	355	420
Total resources (GWh)	12,354	13,038	13,047	13,459	14,024	15,234	15,891	15,944	17,058	17,124	17,189
Energy surplus (deficit)											
Without A.J. Wiley	848	1,975	602	516	564	1,235	1,332	803	1,311	747	157
With A.J. Wiley 7/	-	-	-	-	-	1,478	1,817	1,288	1,796	1,232	642

1/ Idaho Power Company, 1980b; 1981a; 1981b, Application; and 1981c.
2/ 70 percent plant factor.
3/ Combustion turbine available, but not used.
4/ 80 percent plant factor.
5/ 17 percent plant factor.
6/ 60 percent plant factor.
7/ Average annual energy of A.J. Wiley is 485.4 GWh.

Table 6. Idaho Power Company annual energy requirements and system resources available from 1981 to 1991, assuming average streamflow conditions and an average annual load-growth rate of 4.0 percent. 1/

	Adverse streamflow conditions										
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Annual energy required (GWh)	11,506	11,966	12,445	12,943	12,460	13,999	14,559	15,141	15,747	16,377	17,032
Resources											
Existing resources 1/	11,218	11,218	11,218	11,218	11,218	11,218	10,419	10,419	10,419	10,419	10,419
Additions:											
Valmy #1 (10/81)	219	876 4/	876	876	876	876	876	876	876	876	876
Combustion turbine (6/83)			323 3/	323	323	323	323	323	323	323	323
Cascade (1/84)				36	36	36	36	36	36	36	36
Valmy #2 (6/85)				438	876	876	876	876	876	876	876
Lucky Peak (6/85)					96	192	192	192	192	192	192
N. Fork Payette (6/86)					632	790	790	790	790	790	790
Dike (10/87)							72	289	289	289	289
Kanaka Rapids (1/87)							82	82	82	82	82
Coal plant 1 (1/87)							876	876	876	876	876
Coal plant 2 (1/89)									876	876	876
Eagle Rock (6/85)					78	157	157	157	157	157	157
Swan Falls (6/86)					26	55	55	55	55	55	55
Small hydro 4/			9	41	66	109	153	197	240	295	349
Total resources (GWh)	11,437	12,094	12,426	12,494	13,035	14,349	14,907	15,168	16,087	16,142	16,196
Energy surplus (deficit):											
Without A.J. Wiley	(69)	128	(19)	(449)	(425)	350	348	27	340	(195)	(836)
With A.J. Wiley 7/	-	-	-	-	-	530	703	382	695	160	(481)

1/ Idaho Power Company, 1980b; 1981a; 1981b, Application; and 1981c.
2/ Plant factor 80 percent for all coal plants.
3/ 17 percent plant factor.
4/ 50 percent plant factor.
5/ Average annual energy of A.J. Wiley Project under adverse stream-flow conditions would be 355.4 GWh.

Appendix B

SIGNIFICANT GEOLOGICAL EVENTS

The following summary of significant events in the Snake River Canyon's history is presented to enable a better understanding of the unique geology which exists at the proposed project, and subsequently the geological concerns. The summary is an abbreviated version of the canyon's history as developed by Malde (1979, 1981). If a more complete, in-depth history is desired, those reports should be consulted.

The Snake River, at one time, flowed within a wide shallow ancestral valley cut into the Banbury Basalt and the Glenns Ferry Formation. (See Table 3-1 of text for rock unit descriptions.) Madson Basalt flowed into this valley from an eastern source and was subsequently followed by flows of Thousand Springs and Sand Spring Basalt, also from eastern source(s). The Snake River cut down through the Thousand Springs Basalt and Glenns Ferry Formation into the Banbury Basalt, producing a canyon that was deeper than the present canyon, and that apparently skirted the western edge of the Sand Springs Basalt.

The ancestral Wood River Canyon was buried by flows of McKinney Basalt that erupted from McKinney Butte (Figure B-1c). The advancing flow continued onward and subsequently buried the confluence of the Snake River and Wood River Canyons and completely filled a segment of the Snake River Canyon (Figure B-1c) a few miles northwest of the proposed damsite. The Snake River was thus dammed, and a large lake was formed at about elevation 3,150 feet. Where the advancing basalt flowed into the impounded waters of the new lake, pillow lavas were formed. Pillow lava is a porous, brecciated (broken), open-textured, volcanic deposit, formed by rapid cooling of molten lava under water accompanied by simultaneous steam-shattering of the material into fine sand- to boulder-size fragments.

The basalt continued to advance across the inundated canyon by flowing across pillow lava deltas that were continuously formed within the lake at the front of the advancing flow (Figure 3-3). The ancestral Snake River Canyon immediately downstream from the proposed damsite was completely filled in this manner by pillow lava to elevation 3,150 feet. Above that level, the pillow lavas were capped by layered basalt flows which, by not having been subjected to the water, were allowed to cool more slowly.

The eruption from McKinney Butte ceased, leaving the canyon in the project vicinity only partially filled from the northern, or eastern (righthand) rim, by pillow lava deposits with a cap, at the rim, of layered basalt.

The lake, informally referred to as Root Lake, continued to exist, its downstream outlet being through the highly permeable pillow lava that occupied the old canyon.

Clay, carried in by the Snake River, settled out in Root Lake. These deposits, informally referred to as Root Lake Clay, eventually filled the lake--the dammed canyon--to elevation 3,150 feet. Throughout this period, the sole outflow from Root Lake was through the pillow lavas in the buried canyon.

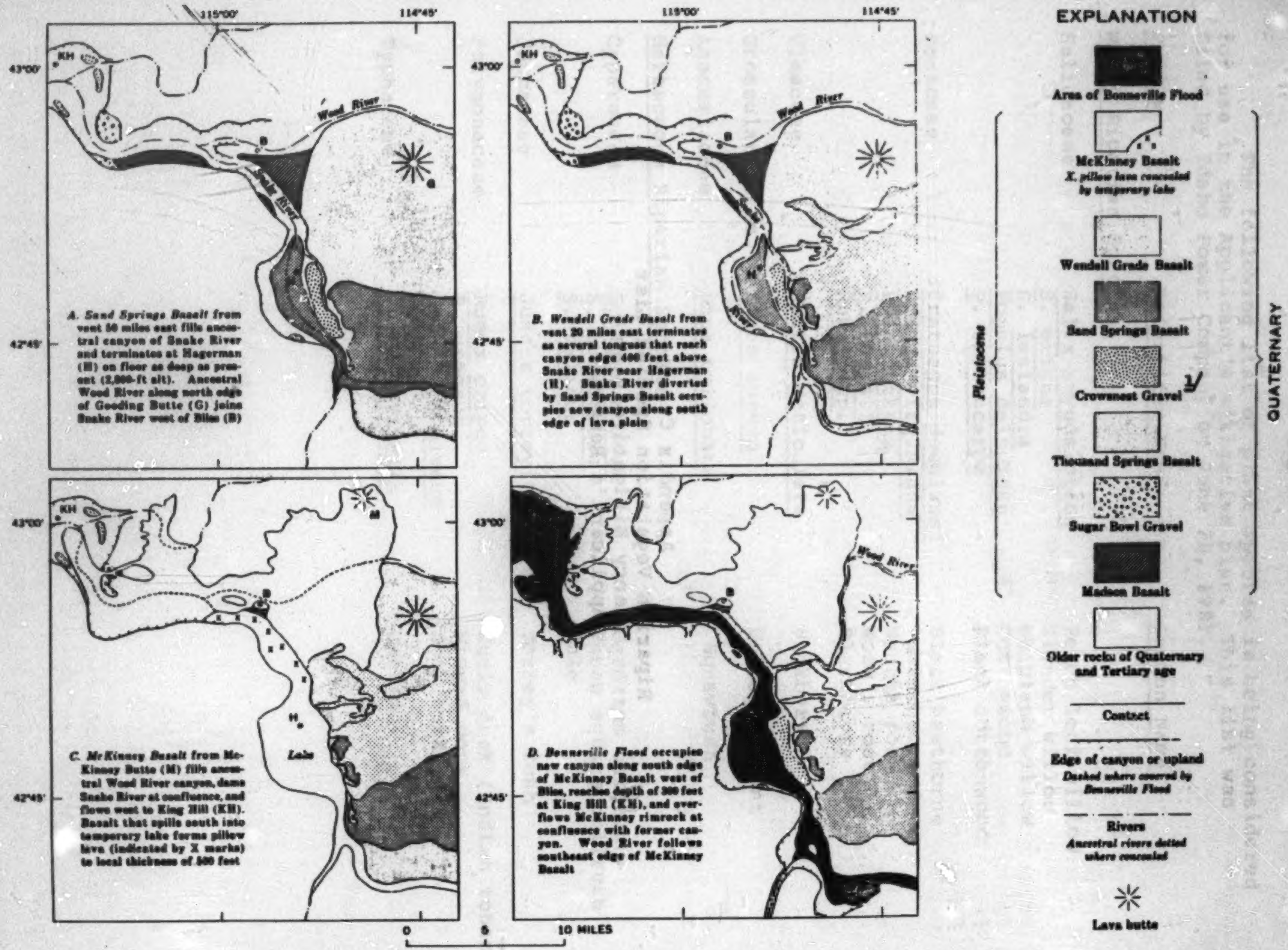
At some time after the Root Lake Clay deposit filled the canyon to elevation 3,150 feet, the lake overflowed near the southwestern extent of the McKinney lava flows. Staff believes the overflow probably occurred because the clays sufficiently sealed the outflows through the pillow lavas thereby causing a rise in the lake level.

Most of the Root Lake Clay was eventually eroded from the lake bed as the new outlet--a new segment of the Snake River Canyon--was cut. The Snake River, upstream from approximately the area of the proposed damsite, continued to downcut through McKinney pillow lava and began to re-excavate within part of the old ancestral canyon that had originally been cut in the relatively resistant Banbury Basalt. (See Figure 3-3).

The Melon Gravel, found today on the main canyon floor terraces, was deposited by the tremendous surge of water that passed through the canyon during the Bonneville Flood. The primary erosional effect of the flood in the project vicinity was the removal of much of the Root Lake Clay that had remained in the old canyon. Apparently, only minor changes have occurred in the canyon since the flood.

Except for Melon gravels on the main canyon floor terraces and some remnant deposits of Root Lake Clay, the left (southwest) side of the canyon, up-canyon from the approximate vicinity of the proposed damsite, is generally much the same today as was the ancestral canyon. Some modification to the left side has been made by erosion in the relatively less resistant Glenns Ferry Formation. The right (northwest) side of this portion of the ancestral canyon now lies buried beneath McKinney pillow lavas and basalt flows. The present canyon rim consists of massive flow basalt capping the underlying pillow lava. The main canyon floor terrain on this side of the river is also paved with Melon Gravels.

The Wood River, having been blocked by McKinney Basalt that filled the ancestral Wood River Canyon, was diverted to its present course along the southeast edge of the McKinney flow. Downcutting by the Big Wood River has subsequently formed Malad Canyon.


115°00'
114°45'
43°00'
42°45'
KH
B
G
H
M
Wood River
Snake River
Lake
0
5
10 MILES
EXPLANATION
Area of Bonneville Flood
McKinney Basalt
X, pillow lava concealed by temporary lake
Wendell Grade Basalt
Sand Springs Basalt
Crowsnest Gravel 1/
Thousand Springs Basalt
Sugar Bowl Gravel
Madson Basalt
Older rocks of Quaternary and Tertiary age
Pleistocene
QUATERNARY
Contact
Edge of canyon or upland
Dashed where covered by Bonneville Flood
Rivers
Ancestral rivers dotted where concealed
Lava butte

A. Sand Springs Basalt from vent 50 miles east fills ancestral canyon of Snake River and terminates at Hagerman (H) on floor as deep as present (2,800-ft alt). Ancestral Wood River along north edge of Gooding Butte (G) joins Snake River west of Bliss (B)

B. Wendell Grade Basalt from vent 20 miles east terminates as several tongues that reach canyon edge 400 feet above Snake River near Hagerman (H). Snake River diverted by Sand Springs Basalt occupies new canyon along south edge of lava plain

C. McKinney Basalt from McKinney Butte (M) fills ancestral Wood River canyon, dams Snake River at confluence, and flows west to King Hill (KH). Basalt that spills south into temporary lake forms pillow lava (indicated by X marks) to local thickness of 500 feet

D. Bonneville Flood occupies new canyon along south edge of McKinney Basalt west of Bliss, reaches depth of 300 feet at King Hill (KH), and overflows McKinney rimrock at confluence with former canyon. Wood River follows southeast edge of McKinney Basalt

Figure B-1. Maps of area between Hagerman and King Hill showing late Pleistocene drainage changes caused by local lava flows (Source: Malde, 1971). Crowsnest Gravel is now recognized as being younger than the Mckinney Basalt (Malde, 1981).

Appendix C
Riparian Vegetation Species List
Agency Mitigative Plan
Applicant's Response

The following list of plant species is being considered for use in the Applicant's mitigative plan. This list was filed by Idaho Power Company on June 30, 1981.

Family	Scientific Name	Common Name
Woody Riparian Species		
Salicaceae	*Salix amygdaloides*	Peach leaf willow
	S. exigua	Slender willow
	S. lasiandra	Whiplash willow
	Populus deltoides	Cottonwood
	P. trichocarpa	Black cottonwood
Rosaceae	*Crataegus douglassi*	Black hawthorne
	Prunus virginiana	Chokecherry
	Rosa nutkana	Nootka rose
	R. woodsii	Wood's rose
	Rubus spp.	Blackberry
Ulmaceae	*Celtis reticulata*	Hackberry
Grossulariaceae	*Ribes aureum*	Golden currant
Anacariaceae	*Rhus trilobata*	Squawbush
Herbaceous Riparian Species		
Cyperaceae	*Scirpus acutus*	Hardstem bullrush
	S. americanus	Three square bullrush
	S. validus	Tule
Juncaceae	*Juncus torreyi*	Torrey's rush
Polygonaceae	*Rumex cripus*	Curly dock (Indian tobacco)
	R. venosue	Winged dock
	Eriogonum niveum	Snow buckwheat
Typhaceae	*Typha latifolia*	Cattail

DEA
P.2845

United States Department of the Interior
FISH AND WILDLIFE SERVICE
AREA OFFICE - IDAHO AND NEVADA
4620 OVERLAND ROAD, ROOM 238
BOISE, IDAHO 83705
FTS: 554-1960 / COMM: 208/334-1960

FEDERAL ENERGY REGULATORY COMMISSION
SEP 28 10 50 AM '81

OFFICIAL FILE COPY

TO SEP 22 1981		DATE
DOCKET		
Idaho		

CENTRAL FILES

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
Attn: Tom Russo
825 N. Capitol St., N.E.
Washington, D.C. 20426

Re: A. J. Wiley Project, Idaho
FERC No. 2845

Dear Mr. Plumb:

During the July 28 EIS scoping meeting for the subject project, your staff requested we submit our recommended wildlife and fisheries mitigation plan. Attached are our proposals. We request that you reference this document in the Draft Environmental Impact Statement and use it in formulating and evaluating the mitigation alternatives.

There will be significant impacts to fish and wildlife resources as a result of this project. We believe that this mitigation plan represents more equitable compensation for project impacts on fish and wildlife than does the mitigation plan in Idaho Power Company's license application. Most, if not all, of the mitigation measures have been discussed with the applicant's staff. They will receive a copy of this document. Once they've had a chance to fully review it, we will continue working with the applicant to try to develop a mutually satisfactory mitigation package.

If you have any questions on our recommendations, you can contact Bob Bell of IDFG (324-4350) concerning the fisheries mitigation and Signe Sather-Blair of the FWS (FTS-554-1931) concerning the wildlife mitigation.

Thank you for your interest in our recommendations.

Sincerely yours,

LAMehrhoff
L. A. Mehrhoff
Area Manager
U. S. Fish and Wildlife Service

RECEIVED
SEP 30 1981
DIVISION OF HYDROPOWER
LICENSING

Jerry Conley
Jerry Conley
Director
Idaho Department of Fish and Game

Enclosure

SEP 28 10 50 AM '81
FEDERAL ENERGY
REGULATORY
COMMISSION

A. J. Wiley Project, FERC 2845
Wildlife and Fisheries Mitigation Plan
Recommended by the
U. S. Fish and Wildlife Service
and the
Idaho Department of Fish and Game

INTRODUCTION

On July 28, 1981, at an A. J. Wiley Project EIS scoping meeting in Gooding, Idaho, Tom Russo of the Federal Energy Regulatory Commission (FERC) requested that the Fish and Wildlife Service (FWS) and Idaho Department of Fish and Game (IDFG) develop and submit to FERC a mitigation plan. The request was made because the FWS and IDFG, while not opposed to the project, were critical of portions of the mitigation plan as outlined in Idaho Power Company's (IPCo) license application, No. 2845 (IPCo 1980).

This mitigation plan represents the combined recommendations of the FWS and IDFG. We have refrained from estimating the feasibility or costs of the proposed mitigation measures. However, we have tried to propose measures that have been tested and/or used for mitigation on other water projects in the west.

Natural characteristics of the Wiley Reach limit the number of mitigation sites that can be developed. However, field inspections of the project site by State and Federal biologists identified several possible on-site mitigation areas other than those proposed by IPCo in the license application (Figure 1). These areas were identified on the basis of slope of the land and existing riparian vegetation. The feasibility of developing these areas for wildlife mitigation needs to be discussed between IPCo engineers and biologists, and personnel from the FWS and IDFG. Some of the areas are in conflict with recreation facilities identified in the license application. For this project, we believe wildlife mitigation areas should be given priority for sites over recreation areas. Recreational facilities need not be located immediately at shoreline, but can be located on nearby uplands. Riparian communities, on the other hand, are dependent on the moist shoreline zone.

MITIGATION

The Wiley Reach contains one of the remaining stretches of free-flowing river in the Snake River Plain. The associated riparian communities include some of the oldest native groves of hackberry and birch along the Snake River. Riparian communities are very limited in the state, representing less than 0.6% of the land area (Boccard, 1980). Because of the vegetative diversity and linear nature ("edge effect") of riparian communities they support higher densities and diversities of birds than do surrounding vegetative communities (Hubbard, 1977, Stevens et. al. 1977, Hehnke and Stone 1978, Jensen 1980). Of special concern to the FWS and IDFG is the importance of the riparian habitat in the Wiley Reach to migratory birds (waterfowl, raptors, shorebirds, and songbirds) and the resident upland game birds (pheasant, quail, and chukar partridge).

Because of the wildlife species diversity and richness associated with riparian communities and the precarious future of these communities in lieu of hydroelectric and other development activities, the FWS has assigned woody riparian habitat to Resource Category 2, in accordance with its Mitigation Policy (Fed. Reg., Vol. 46, No. 15). The "Designation Criteria" for this category states, "Habitat to be impacted is of high value for evaluation species and is relatively scarce or becoming scarce on a national basis or ecoregion section." We, therefore, request "no net loss of in-kind habitat value."

Shoshone sculpin (Cothus greenei) is an Idaho "species of special concern" and a candidate species for listing as threatened/endangered. It inhabits springs and spring-fed streams along the Snake River between Bliss Dam and Kanaka Rapids (Griffith, et al. 1981). No specimens have been found beyond these points. Springs within the Wiley Reach which would be inundated as a result of the project do support populations of Shoshone sculpin. Mitigation for this loss is requested.

In Idaho, white sturgeon maintain viable populations only in free-flowing stream sections. A severely depleted white sturgeon population exists between Bliss Dam and Shoshone Falls (Lukins 1981). Dam construction within this reach has blocked upstream spawning migration, isolated sturgeon populations, and caused the loss of potential spawning and rearing habitat. IDFG considers the lost white sturgeon habitat in the Wiley Reach as irreplaceable. Therefore, we have no mitigation recommendations concerning this species and its habitat.

Mitigation Goals

Wildlife

1. In-kind replacement of woody riparian vegetation.
2. Plant and maintain emergent herbaceous wetland vegetation.
3. Establish breeding waterfowl populations with primary emphasis on Canada geese.
4. Protect raptors from transmission-line pole electrocution.
5. Protect mitigation areas where grazing may occur.

Fisheries

1. Control soil erosion during construction and along reservoir shoreline after project is completed.
2. Establish a self-sustaining warm-water/cold-water fishery, whichever acclimates to the reservoir conditions most successfully.
3. Develop reservoir shoreline and bottom to improve fish habitat.

4. Provide a recreational fishery until a self-sustaining fishery is established.

5. Protect some portion of remaining Shoshone sculpin habitat.

Constructional and Management Measures Recommended to Achieve Mitigation Goals

Wildlife

1. In-kind replacement of woody riparian habitat.

We request that IPCo re-establish 100 acres of woody riparian habitat as mitigation for the loss of 74 acres. We recommend 100 acres for three reasons: (1) we assume that re-establishment efforts will be less than 100% successful; (2) it will be one to two decades before re-established areas provide wildlife habitat comparable to that woody riparian habitat lost; and (3) the re-established areas will be a poorer quality than what currently exists due to the non-linear and block design of the mitigation areas. A reduction in ecotone results in a decrease in associated species richness and diversity (Odum 1971).

IPCo should concentrate on re-establishing native shrub and tree species indigenous to the area. Special effort should be made to re-establish hackberry (Celtis douglassi) and water birch (Betula occidentalis). The IDFG should provide technical assistance concerning the planting scheme, the number and organization of species, for each mitigation site. The Bureau of Land Management and the Soil Conservation Service could also provide assistance.

In order to improve the success of the planting effort, we recommend that irrigation systems be installed at each mitigation site. Irrigation of the sites should continue (probably 2 to 3 years) until the root systems of the vegetation are developed and have penetrated to the water table. During this period, re-establishment success of each species should be monitored and a replanting program established. In some instances, it may be necessary to discontinue one species because of poor success and attempt to establish another species.

We have recommended that IPCo re-establish 100 acres of woody riparian habitat. If this amount cannot be re-established on-site, IPCo should be required to mitigate the remainder off-site. We have recommended to IPCo that they improve the woody riparian habitat on their existing reservoirs in the general vicinity of the A. J. Wiley Project, i.e., Upper or Lower Salmon Falls Pools and Bliss Pool.

We also recommend that IPCo investigate the possibility of developing water sources, i.e., well drilling, at the top of some of the draws coming into the Wiley Reach and Lower Salmon Falls Pool. The water would than be allowed to trickle down the draw, thus providing the needed moisture for woody riparian species. Some selective plantings should be done to hasten shrub and tree growth in these draws.

2. Establish emergent wetland habitat.

   IPCo plans to develop the slope and soil of the areas suitable for emergent wetland vegetation as described in their application (IPCo 1980). Because of the daily water level fluctuations in the reservoir, we question that emergent wetland vegetation will establish without the use of subimpoundments. We recommend that IPCo construct dikes for three of the mitigation areas (Figure 1). These dikes should be constructed so that inflow and outflow of water into the subimpoundments can be manipulated. Subimpoundments have been very effective for creating wetlands and providing waterfowl habitat in other reservoirs in the west (Nelson, et al. 1978, Childress and Eng 1979). Therefore, the probable success of this measure should be good and should significantly improve the chances of establishing wetland vegetation attractive to waterfowl.

   Emergent wetland species (*Typha* sp. and *Scirpus* sp.) should be planted within the impoundments and at the other mitigation sites as indicated in Figure 1. The plantings should be monitored and evaluated, especially in the undiked areas to evaluate if a one to two foot daily water level fluctuation does impair vegetation establishment and growth. If it does, a replanting program similar to that for the woody riparian habitat should be instituted.

3. Establish a breeding waterfowl population with primary emphasis on Canada geese.

   Waterfowl habitat efforts should concentrate on the three wetland impoundment areas and the mitigation sites near the dam (Figure 1). A minimum of 24 islands and 24 nest platforms should be constructed. We suggest IPCo follow the island construction specifications as described by Giroux (1981).

   Recommendations resulting from Giroux's research indicate:

   1. Islands should be approximately 0.1 ha in size and rectangular in shape.
   2. Islands should be at least 170 m from the mainland (for this project we recommend 90 m due to the size of the mitigation areas).
   3. Water around the island should be at least 70 cm in depth during the nesting season.
   4. Islands should be planted with a grass/legume mixture and irrigated at time of seeding.
   5. Islands should be no closer to each other than 100 m (for this project this may not be feasible due to the size of the mitigation areas).
   6. Islands should not be positioned in dense emergent wetland vegetation.

We also recommend that the island shore nearest to the mainland be planted with bands of emergent wetland and woody riparian species. All other sides should be left open. This planting strategy will provide concealment, as well as easy access to water for nesting waterfowl.

The goose stocking program should be initiated after island vegetation is established. An initial stocking of 50 goslings the first year would be adequate. However, additional stocking may be necessary in subsequent years. We recommend that IPCo plan to stock 150 goslings over a 3 year period (unless a breeding population of 20 pairs becomes established on the reservoir in that time).

4. Protect raptors from transmission-line pole electrocution.

   Since this area does receive raptor use, IPCo should install raptor-proof transmission-line poles similar to those currently used by the company.

5. Protect mitigation areas where grazing may occur.

   Cattle and sheep grazing reduce the quality and quantity of riparian vegetation (Behnke and Raleigh 1979, Platts 1981). Grazing access to the mitigation areas would jeopardize the success of the planting program. Therefore, we recommend that mitigation sites be fenced where grazing may occur and that the fencing be maintained.

Fisheries

1. Control erosion during construction and along reservoir shoreline after project is completed.

   IPCo plans to reduce siltation impacts on downstream fisheries by scheduling certain construction activities to avoid conflict with peak periods of fish spawning (IPCo 1980). Bank stabilization and erosion control structures are planned to help reduce sediment loads.

   We recommend that State environmental quality control standards and procedures be followed by IPCo during the construction phase. A monitoring program should be established that would include representatives of State and Federal resource agencies.

   The quality of the fishery will depend a great deal on soil erosion control into the reservoir. We recommend that reservoir clearing be kept to a minimum and that shoreline revegetation commence as soon as possible. Vegetation should be watered, and fertilized if necessary, until well established. Grazing should be restricted from areas with high erosion potential.

2. Establish a self-sustaining warm-water/cold-water fishery, whichever one acclimates to reservoir conditions most successfully.

   There is uncertainty among fishery biologists as to whether the Wiley Pool would be better suited for a warm-water or cold-water fishery. For this reason, we recommend that IPCo stock 55,000 fingerling rainbow and 55,000 fingerling brown trout, as well as 100,000 fingerlings each of black crappie and smallmouth bass. Future rates would be determined from a monitoring program and after consultation with IDFG. Initial stocking should begin one year after completion of reservoir filling. Angler success and preference should be evaluated in terms of species caught, fish size and age, and length of time spent per fish caught.

   The success of establishing a self-sustaining fishery would be improved if other mitigation measures, i.e. shoreline revegetation and erosion control are successful. These measures, therefore, should be viewed in context with their importance for establishing a quality fishery.

3. Develop reservoir shoreline and bottom to improve fish habitat.

   Shoreline revegetation has been discussed in the wildlife mitigation section. IPCo has indicated that it plans to leave the inundated trees standing (IPCo 1980). This is a good measure, since these trees will provide fish cover as well as substrate for food items. Depending on the amount of reservoir clearing, we also suggest that a number of fish shelters be constructed in the reservoir (Nelson, et al. 1978). Shelters add structural diversity to reservoir bottoms providing cover and feeding habitat for zooplankton and fish.

   IPCo has suggested placement of spawning gravel at the mouth of the Malad River. Although we do not object to this, we question the gravel's permanence due to the spring flows of the Malad River. This measure should be considered an experimental mitigation measure.

4. Provide a recreational fishery until self-sustaining fishery is evident.

   Until such time that the reservoir is producing and supporting a game fishery, IPCo should annually stock the reservoir with catchable rainbow trout. We suggest stocking at a rate of 20,000/year. If the reservoir proves to be incapable of supporting a breeding game fishery, this mitigation measure should continue for the life of the project.

5. Protect portion of remaining Shoshone sculpin habitat.

   IPCo should investigate the purchase of a spring with an existing Shoshone sculpin population. The spring should be one where there is a potential threat to its existence or water quality. IDFG can identify several such springs in the vicinity of the Wiley Project. If such a purchase is deemed feasible and is eventually made, the land should be deeded to the IDFG.

Figure 1. Description of potential wildlife mitigation areas.

Mitigation Area

#1. 12 acres woody riparian; 6 acres emergent wetland; 5 goose nesting islands. Comments: Portions of this site may be in conflict with construction plans for Shoestring Road. The area should be irrigated until planted shrubs and trees are established. Reservoir water level fluctuations should be monitored here to evaluate effects on wetland plantings.

#2. 9 acres woody riparian; 4 acres emergent wetland; 3 goose nesting islands. Comments: Portions of this site are in conflict with proposed recreation facility. See comments for mitigation area 1.

#3. 2 acres woody riparian; 1 acre emergent wetland; 1 goose nest. Comments: Riparian plantings should be irrigated until established.

#4. 2 acres woody riparian; 1 acre emergent wetland. Comments: See comments for mitigation area 3.

#5. 1 acre woody riparian; 2 acres emergent wetland. Comments: See comments for mitigation area 3.

#6. 4 acres woody riparian; 3 acres emergent wetland. Comments: See comments for mitigation area 3. This area should also have water level fluctuations monitored to evaluate effects on wetland plantings.

#7. 9 acres woody riparian; 9 acres emergent wetland; 8 goose nesting islands. Comments: This is a wetland subimpoundment area. The woody riparian vegetation should be irrigated until established. Vigor of emergent wetland vegetation should be evaluated for comparison with plantings at other mitigation areas. The recreation facility proposed by IPCo for this area should either be removed or relocated. This is an important waterfowl mitigation area and human harassment should be kept at a minimum.

#8. 24 acres woody riparian; 8 acres wetland; 4 goose nesting islands. Comments: This is a wetland subimpoundment area. The woody riparian vegetation should be irrigated until established.

#9. 5 acres woody riparian. Comments: See comments for mitigation area 3.

#10. 2.1 acres woody riparian; 2 acres emergent wetland; 3 goose nesting islands. Comments: See comments for mitigation area 8.

#11. 17 acres woody riparian; 3 acres emergent wetland. Comments: See comments for mitigation area 6.

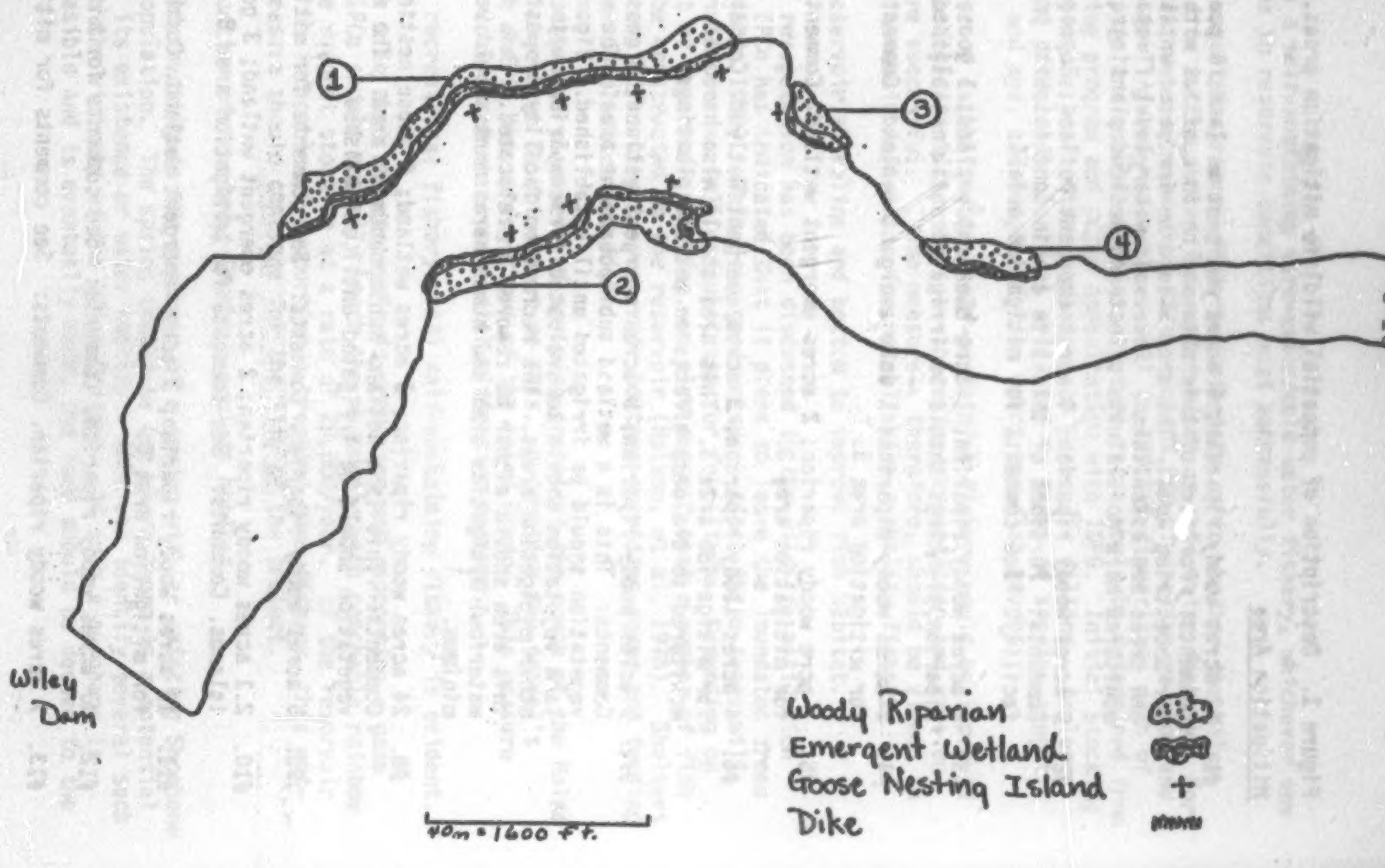
#12. 17 acres woody riparian. Comments: See comments for mitigation area 3.

#13. 7 acres woody riparian. Comments: See comments for mitigation area 3.

Figure. 1

A.J. Wiley Project

Wildlife Mitigation Areas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Woody Riparian
Emergent Wetland
Goose Nesting Island +
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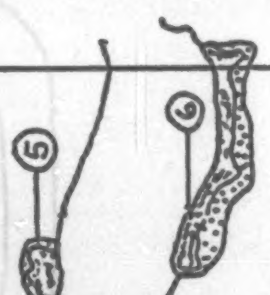

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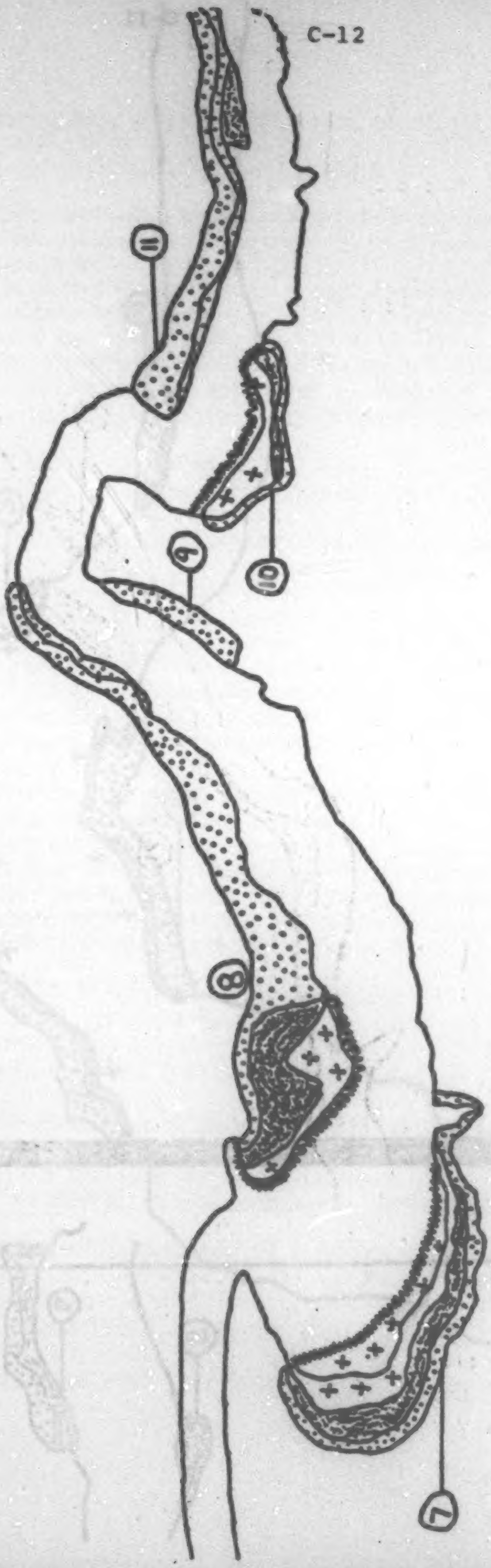
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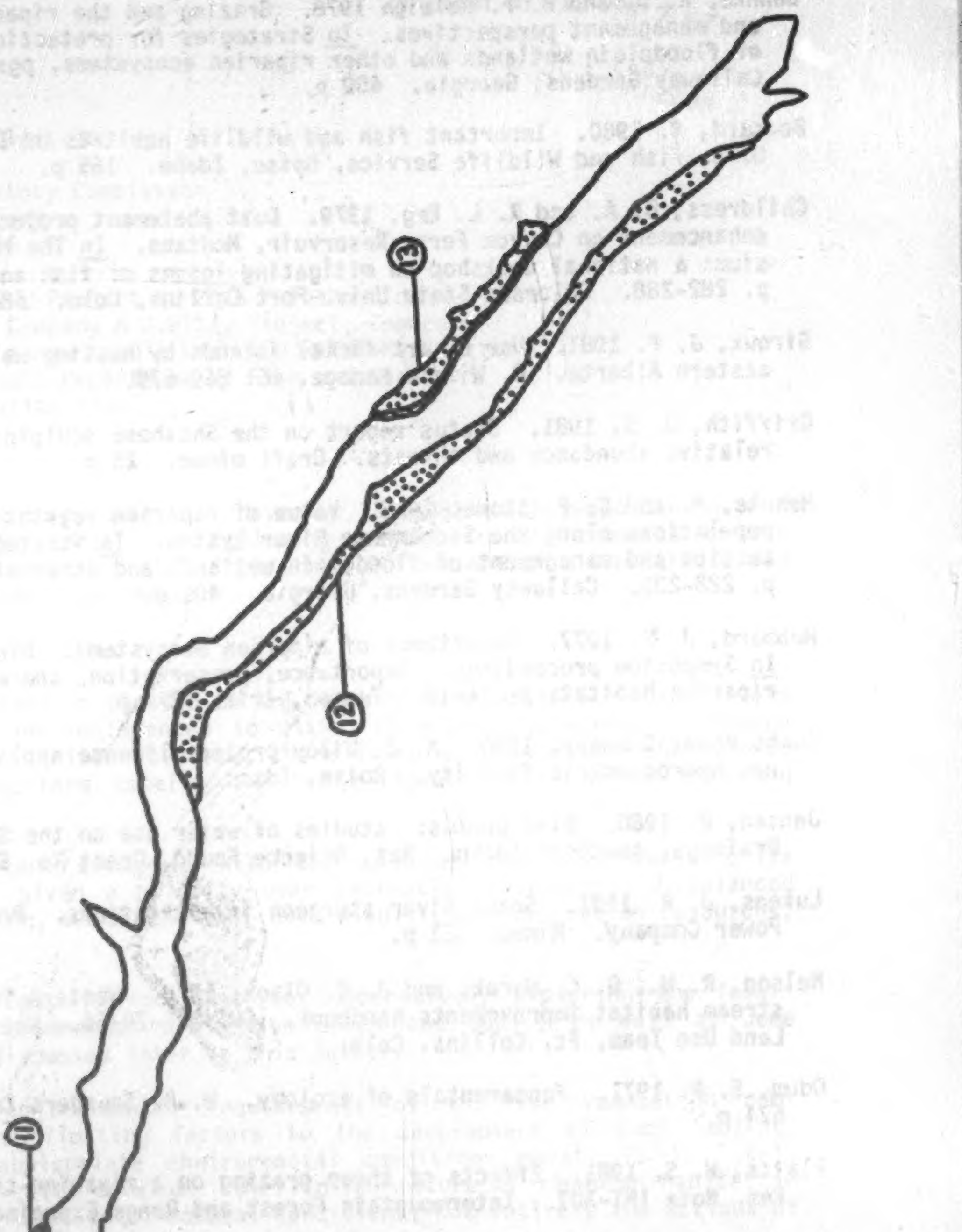
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IDAHO POWER COMPANY

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FEDERAL ENERGY
REGULATORY COMMISSION

December [illegible], 1981

Mr William W Lindsay
Director, Office of Electric
Power Regulation
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D C 20426

Re: OEPR/DHL Project No 2845 - Idaho, Idaho Power Company A J Wiley Project, Comments in Response to U S Fish and Wildlife Service and Idaho Department of Fish and Game Mitigation Plan.

Dear Mr Lindsay:

This refers to my letter of November 13, 1981 which responded to your letter of October 14, 1981. The following are Applicant's comments to the joint letter of September 22, 1981 from the U S Fish and Wildlife Service and the Idaho Fish and Game Department.

GENERAL COMMENTS:

1. Applicant is opposed to the proposal that artificial, short-term irrigation projects be implemented to establish mitigation goals. Although such efforts may have initial success, there is no assurance that the efforts would result in long-term benefits to the mitigation goal or to fish and wildlife resources.

2. Applicant disagrees with the agencies that fish and wildlife resources should be given a priority over recreation resources. A balanced approach to mitigation, which includes both wildlife and recreation resources, is advocated.

3. Applicant is receptive to cooperatively exploring the feasibility of agency recommended mitigation sites and goals, as well as some additional options discussed later in this letter.

4. The environmental requirements of riparian vegetation communities are natural limiting factors to the development of such habitat. However, wherever appropriate environmental conditions exist, it is likely riparian communities will develop. The limited nature of riparian habitat in Southern Idaho is a function of natural conditions, not entirely the actions of mankind.

Agencies overlook the contribution of water impoundment projects along the Snake River to the development or maintenance of riparian habitat.

Some of these impoundments, notably C J Strike Reservoir and Swan Falls Reservoir, are projects built by the Applicant. Other impoundment projects are of such significant value that they have been designated as part of the nation's national wildlife refuge system, i.e., Deer Flat National Wildlife Refuge and the Minidoka National Wildlife Refuge.

SPECIFIC COMMENTS:

Page 3:

1. In-kind Replacement of Woody Riparian Habitat. Paragraph 1 - Applicant agrees with the commenting agencies that in-kind replacement of woody riparian vegetation is a desirable mitigation goal. Supplemental information to the license application submitted to FERC on June 26, 1981, and distributed to appropriate agencies on November 18, 1981, support this position.

   Further evaluation of existing vegetation in the project area indicates that approximately 85 acres of woody riparian habitat will be inundated, rather than the 74 acres indicated in the application.

   Applicant believes that re-establishment of 100 acres of woody riparian habitat is unjustified. Applicant disagrees that efforts will necessarily be less than successful and that re-established areas will be of lower quality than those which currently exist.

   Paragraph 2 - Applicant agrees with commenting agencies that the mitigation effort should concentrate on the establishment of shrub and tree species indigenous to the area. Applicant welcomes the offer of technical aid by state and federal agencies in developing a habitat development plan.

   Paragraph 3 - Applicant opposes the use of short-term mechanical irrigation systems, i.e. pumps and sprinklers. Applicant believes long-term stable irrigation methods are preferable as a method to develop long-term woody riparian communities. As an alternative, the applicant proposes that the development of existing springs for gravity flow irrigation within the project reach be explored. At least three springs are located within or near the project boundary which may lend themselves to this type of development. Diversion of spring water to suitable, nearby mitigation sites may provide a stable long-term water supply, and thus greatly enhance the possibility of successful mitigation. Applicant also agrees that mitigation efforts should be monitored during the early years of its establishment.

Paragraph 4 - Applicant opposes efforts to establish off-site mitigation areas.

Paragraph 5 - Applicant opposes the recommendation of well drilling to establish water supplies for mitigation areas.

Page 4:

3. Establishment of a Breeding Waterfowl Population. Although the Applicant initially proposed an attempt to introduce waterfowl, a careful reconsideration of this proposal is currently recommended. Applicant's biologists feel that natural recruitment into the area from existing populations is likely to occur, if nesting conditions are acceptable to waterfowl. Applicant proposes that mitigation efforts be directed at the development of quality waterfowl habitat, rather than at a specific number of breeding pairs. Applicant agrees with the concept of designing goose nesting islands utilizing proper design criteria.

Page 5:

4. Protect raptors from accidental electrocution. Agencies recommend that transmission structures be built to protect large birds of prey from accidental electrocution. Such protection is inherent in the design of the proposed transmission structures. Electrocution of birds of prey is a phenomenon associated with lines of a lower voltage than those proposed. Applicant pioneered the development of design standards to prevent accidental death of large birds on electrical lines.

5. Protect Mitigation Areas Where Grazing May Occur. Commenting agencies express concern that cattle and sheep grazing may reduce the effectiveness of mitigation efforts in some areas. Applicant shares this concern, however, fencing should be approached with caution. Applicant does not support fencing where it will limit access to water by livestock and thus affect existing adjacent land uses.

FISHERIES:

1. Erosion Control:

Applicant agrees that reasonable erosion control measures should be implemented during construction.

Page 6:

2. Establish a Self-Sustaining Warmwater/Coldwater Fishery:

   Applicant does not oppose the idea of studying warm water/cold water fisheries in the proposed A J Wiley reservoir. However, if Shoshone sculpin habitat at one of the inflowing springs is to be investigated, considerations should be made concerning the prey-predator relationships of smallmouth bass, black crappie, and the sculpin. The inflow of the spring may be utilized, at specific times during the year, by very efficient prey fish as well as the sculpin.

3. Develop Reservoir Shoreline and Bottom to Improve Fish Habitat:

   No Comment

4. Provide a Recreational Fishery:

   A "self-sustaining fishery" should be better defined. Applicant feels that recruitment from natural production as well as incidental commercial hatchery liberations may supply a large contribution to the fishing public. While not opposed to the stocking rate of 20,000 catchable rainbow trout/year, Applicant feels that a better definition of a "self-sustaining fishery" (i.e., a desirable harvest number) would aid in this consideration.

5. Protect Portions of Remaining Shoshone Sulpin Habitat:

   Applicant believes it unnecessary and unjustified that any project lands should be deeded to any person or agency.

Respectfully submitted,

Nicolas R. Ysursa

Nicolas R Ysursa
Attorney

NRY:ke

cc: Lee Sherline
Tom Russo - FERC

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

DATED this 17th day of December, 1981.

/s/ Nicolas R Ysursa
Nicolas R Ysursa

CERTIFICATE OF MAILING

I HEREBY CERTIFY that on this 17th day of December, 1981, I mailed true and correct copies of the foregoing document upon:

Peter A Bowler
560 St. Anns
Laguna Beach, California 92651

Mr Robert W Lesser
Chairman
Idaho Whitewater Association
P O Box 699
Boise, Idaho 83701

Mr and Mrs Aldrich Bowler
Snake River Pottery
Bliss, Idaho 83314

Idaho Conservation League, et al
c/o Friends of the Snake River
P O Box 28
Bliss, Idaho 83314

Mr John C Vehlow
Deputy Attorney General
Idaho Department of Fish & Game
P O Box 25
Boise, Idaho 83707

by depositing copies of the same in the United States mail, postage prepaid, in evelopes addressed to said persons at the foregoing addresses.

/s/ Nicolas R Ysursa
Nicolas R Ysursa

Appendix D Form L-2: Terms and Conditions of License for Unconstructed Major Project Affecting Lands of the United States

Form L-2
(Revised October, 1975)

FEDERAL ENERGY REGULATORY COMMISSION

TERMS AND CONDITIONS OF LICENSE FOR UNCONSTRUCTED MAJOR PROJECT AFFECTING LANDS OF THE UNITED STATES

Article 1. The entire project, as described in this order of the Commission, shall be subject to all of the provisions, terms, and conditions of the license.

Article 2. No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided, however, That if the Licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval a revised, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3. The project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, there shall not be made without prior approval of the Commission any substantial alteration or addition not in conformity with the approved plans to any dam or other project works under the license or any substantial use of project lands and waters not authorized herein; and any emergency alteration, addition, or use so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in project works, or in uses of project lands and waters, or divergence from such approved exhibits may be made if such changes will not result in a decrease in efficiency, in a material increase in cost, in an adverse environmental impact, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct.

Upon the completion of the project, or at such other time as the Commission may direct, the Licensee shall submit to the Commission for approval revised exhibits insofar as necessary to show any divergence from or variations in the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the exhibits approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the Licensee necessitated or justified variation in or divergence from the approved exhibits. Such revised exhibits shall, if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4. The construction, operation, and maintenance of the project and any work incidental to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The Licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the Licensee that will provide for an adequate and qualified inspection force for construction of the project and for any subsequent alterations to the project. Construction of the project works or any feature or alteration thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The Licensee shall also furnish to said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonably specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The Licensee shall allow said representative and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The Licensee shall comply with such rules and regulations of general or special applicability as the Commission may prescribe from time to time for the protection of life, health, or property.

Article 5. The Licensee, within five years from the date of issuance of the license, shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance, and operation of the project. The Licensee or its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the Licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deeds or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6. In the event the project is taken over by the United States upon the termination of the license as provided in Section 14 of the Federal Power Act, or is transferred to a new licensee or to a non-power licensee under the provisions of Section 15 of said Act, the Licensee, its successors and assigns shall be responsible for, and shall make good any defect of title to, or of right of occupancy and use in, any of such project property that is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and shall pay and discharge, or shall assume responsibility for payment and discharge of, all liens or encumbrances upon the project or project property created by the Licensee or created or incurred after the issuance of the license: Provided, That the provisions of this article are not intended to require the Licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to, or right of occupancy and use in, any of such project property than was necessary to acquire for its own purposes as the Licensee.

Article 7. The actual legitimate original cost of the project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Federal Power Act and the Commission's Rules and Regulations thereunder.

Article 8. The Licensee shall install and thereafter maintain gages and stream-gaging stations for the purpose of determining the stage and flow of the stream or streams on which the project is located, the amount of water held in and withdrawn from storage, and the effective head on the turbines; shall provide for the required reading of such gages and for the adequate rating of such stations; and shall install and maintain standard meters adequate for the determination of the amount of electric energy generated by the project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission or its authorized representative. The Commission reserves the right, after notice and opportunity for hearing, to require such alterations in the number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, as are necessary to secure adequate determinations. The installation of gages, the rating of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of the project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision, or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient records of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 9. The Licensee shall, after notice and opportunity for hearing, install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so.

Article 10. The Licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the Licensee as the Commission may order.

Article 11. Whenever the Licensee is directly benefited by the construction work of another licensee, a permittee, or the United States on a storage reservoir or other headwater improvement, the Licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereof as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States, the Licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the cost of making the determinations pursuant to the then current regulations of the Commission under the Federal Power Act.

Article 12. The operations of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes, and the Licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Commission may prescribe for the purposes hereinbefore mentioned.

Article 13. On the application of any person, association, corporation, Federal agency, State or municipality, the Licensee shall permit such reasonable use of its reservoir or other project properties, including works, lands and water rights, or parts thereof, as may be ordered by the Commission, after notice and opportunity for hearing, in the interests of comprehensive development of the waterway or waterways involved and the conservation and utilization of the water resources of the region for water supply or for the purposes of steam-electric, irrigation, industrial, municipal or similar uses. The Licensee shall receive reasonable compensation for use of its reservoir or other project properties or parts thereof for such purposes, to include at least full reimbursement for any damages or expenses which the joint use causes the Licensee to incur. Any such compensation shall be fixed by the Commission either by approval of an agreement between the Licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot concurrently be submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 14. In the construction or maintenance of the project works, the Licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the Licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the Licensee from any responsibility or requirement which may be imposed by any other lawful authority for avoiding or eliminating inductive interference.

Article 15. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance, and operation of such reasonable facilities, and comply with such reasonable modifications of the project structures and operation, as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing.

Article 16. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of the Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be reasonably prescribed by the Commission in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under this license.

Article 17. The Licensee shall construct, maintain, and operate, or shall arrange for the construction, maintenance, and operation of such reasonable recreational facilities, including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities, and utilities, giving consideration to the needs of the physically handicapped, and shall comply with such reasonable modifications of the project, as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal or State agencies, after notice and opportunity for hearing.

Article 18. So far as is consistent with proper operation of the project, the Licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting: Provided, That the Licensee may reserve from public access such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property.

Article 19. In the construction, maintenance, or operation of the project, the Licensee shall be responsible for, and shall take reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. The Commission, upon request or upon its own motion, may order the Licensee to take such measures as the Commission finds to be necessary for these purposes, after notice and opportunity for hearing.

Article 20. The Licensee shall consult with the appropriate State and Federal agencies and, within one year of the date of issuance of this license, shall submit for Commission approval a plan for clearing the reservoir area. Further, the Licensee shall clear and keep clear to an adequate width lands along open conduits and shall dispose of all temporary structures, unused timber, brush, refuse, or other material unnecessary for the purposes of the project which results from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the periphery of project reservoirs which may die during operations of the project shall be removed. Upon approval of the clearing plan all clearing of the lands and disposal of the unnecessary material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission and in accordance with appropriate Federal, State, and local statutes and regulations.

Article 21. Timber on lands of the United States cut, used, or destroyed in the construction and maintenance of the project works, or in the clearing of said lands, shall be paid for, and the resulting slash and debris disposed of, in accordance with the requirements of the agency of the United States having jurisdiction over said lands. Payment for merchantable timber shall be at current stumpage rates, and payment for young growth timber below merchantable size shall be at current damage appraisal values. However, the agency of the United States having jurisdiction may sell or dispose of the merchantable timber to others than the Licensee: Provided, That timber so sold or disposed of shall be cut and removed from the area prior to, or without undue interference with, clearing operations of the Licensee and in coordination with the Licensee's project construction schedules. Such sale or disposal to others shall not relieve the Licensee of responsibility for the clearing and disposal of all slash and debris from project lands.

Article 22. The Licensee shall do everything reasonably within its power, and shall require its employees, contractors, and employees of contractors to do everything reasonably within their power, both independently and upon the request of officers of the agency concerned, to prevent, to make advance preparations for suppression of, and to suppress fires on the lands to be occupied or used under the license. The Licensee shall be liable for and shall pay the costs incurred by the United States in suppressing fires caused from the construction, operation, or maintenance of the project works or of the works appurtenant or accessory thereto under the license.

Article 23. The Licensee shall interpose no objection to, and shall in no way prevent, the use by the agency of the United States having jurisdiction over the lands of the United States affected, or by persons or corporations occupying lands of the United States under permit, of water for fire suppression from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license, or the use by said parties of water for sanitary and domestic purposes from any stream, conduit, or body of water, natural or artificial, used by the Licensee in the operation of the project works covered by the license.

Article 24. The Licensee shall be liable for injury to, or destruction of, any buildings, bridges, roads, trails, lands, or other property of the United States, occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Arrangements to meet such liability, either by compensation for such injury or destruction, or by reconstruction or repair of damaged property, or otherwise, shall be made with the appropriate department or agency of the United States.

Article 25. The Licensee shall allow any agency of the United States, without charge, to construct or permit to be constructed on, through, and across those project lands which are lands of the United States such conduits, chutes, ditches, railroads, roads, trails, telephone and power lines, and other routes or means of transportation and communication as are not inconsistent with the enjoyment of said lands by the Licensee for the purposes of the license. This license shall not be construed as conferring upon the Licensee any right of use, occupancy, or enjoyment of the lands of the United States other than for the construction, operation, and maintenance of the project as stated in the license.

Article 26. In the construction and maintenance of the project, the location and standards of roads and trails on lands of the United States and other uses of lands of the United States, including the location and condition of quarries, borrow pits, and spoil disposal areas, shall be subject to the approval of the department or agency of the United States having supervision over the lands involved.

Article 27. The Licensee shall make provision, or shall bear the reasonable cost, as determined by the agency of the United States affected, of making provision for avoiding inductive interference between any project transmission line or other project facility constructed, operated, or maintained under the license, and any radio installation, telephone line, or other communication facility installed or constructed before or after construction of such project transmission line or other project facility and owned, operated, or used by such agency of the United States in administering the lands under its jurisdiction.

Article 28. The Licensee shall make use of the Commission guidelines and other recognized guidelines for treatment of transmission line rights-of-way, and shall clear such portions of transmission line rights-of-way across lands of the United States as are designated by the officer of the United States in charge of the lands; shall keep the areas so designated clear of new growth, all refuse, and inflammable material to the satisfaction of such officer; shall trim all branches of trees in contact with or liable to contact the transmission lines; shall cut and remove all dead or leaning trees which might fall in contact with the transmission lines; and shall take such other precautions against fire as may be required by such officer. No fires for the burning of waste material shall be set except with the prior written consent of the officer of the United States in charge of the lands as to time and place.

Article 29. The Licensee shall cooperate with the United States in the disposal by the United States, under the Act of July 31, 1947, 61 Stat. 681, as amended (30 U.S.C. sec. 601, *et seq.*), of mineral and vegetative materials from lands of the United States occupied by the project or any part thereof: Provided, That such disposal has been authorized by the Commission and that it does not unreasonably interfere with the occupancy of such lands by the Licensee for the purposes of the license: Provided further, That in the event of disagreement, any question of unreasonable interference shall be determined by the Commission after notice and opportunity for hearing.

Article 30. If the Licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address of the Licensee or its agent, the Commission will deem it to be the intent of the Licensee to surrender the license. The Commission, after notice and opportunity for hearing, may require the Licensee to remove any or all structures, equipment and power lines within the project boundary and to take any such other action necessary to restore the project waters, lands, and facilities remaining within the project boundary to a condition satisfactory to the United States agency having jurisdiction over its lands or the Commission's authorized representative, as appropriate, or to provide for the continued operation and maintenance of nonpower facilities and fulfill such other obligations under the license as the Commission may prescribe. In addition, the Commission in its discretion, after notice and opportunity for hearing, may also agree to the surrender of the license when the Commission, for the reasons recited herein, deems it to be the intent of the Licensee to surrender the license.

Article 31. The right of the Licensee and of its successors and assigns to use or occupy waters over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless the Licensee has obtained a new license pursuant to the then existing laws and regulations, or an annual license under the terms and conditions of this license.

Article 32. The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

Appendix E. Federal Power Commission (now Federal Energy Regulatory Commission) Order 415-C (compliance with the National Environmental Policy Act); Federal Power Commission Rules of Practices and Procedures, 18 CFR 1.8, Intervention

FEDERAL POWER COMMISSION-ORDER 415-C
(Issued December 18, 1972)
STATEMENT OF GENERAL POLICY TO IMPLEMENT PROCEDURES FOR COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

§ 2.80 Detailed Environmental Statement.

(a) It shall be the general policy of the Federal Power Commission to adopt and to adhere to the objectives and aims of the National Environmental Policy Act of 1969 (Act) in its regulation under the Federal Power Act and the Natural Gas Act. The National Environmental Policy Act of 1969 requires, among other things, all Federal agencies to include a detailed environmental statement in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment.

(b) Therefore, in compliance with the National Environmental Policy Act of 1969 the Commission staff shall make a detailed environmental statement when the regulatory action taken by us under the Federal Power Act and Natural Gas Act will have a significant environmental impact. A "detailed statement" prepared in compliance with the requirements of §§ 2.81 through 2.82 of this Part shall fully develop the five factors listed hereinafter in the context of such considerations as the proposed activity's direct and indirect effect on the air and water environment of the project or natural gas pipeline facility; on the land, air, and water biota; on established park and recreational areas; and on sites of natural, historic, and scenic values and resources of the area. The statement shall discuss the extent of the conformity of the proposed activity with all applicable environmental standards. The statement shall also fully deal with alternative courses of action to the proposal and, to the maximum extent practicable, the environmental effects of each alternative. Further, it shall specifically discuss plans for future development related to the application under consideration.

The above factors are listed to merely illustrate the kinds of values that must be considered in the statement. In no respect is this listing to be construed as covering all relevant factors.

The five factors which must be specifically discussed in the detailed statement are:

(1) the environmental impact of the proposed action,
(2) any adverse environmental effects which cannot be avoided should the proposal be implemented;
(3) alternatives to the proposed action,
(4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
(5) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

(c) (i) To the maximum extent practicable no final administrative action is to be taken sooner than ninety days after a draft environmental statement has been circulated for comment or thirty days after the final text of an environmental statement has been made available to the Council on Environmental Quality and the public.

(c) (ii) Upon a finding that it is necessary and appropriate in the public interest, the Commission may dispense with any time period specified in §§ 2.80-2.82.

§ 2.81 Compliance with the National Environmental Policy Act of 1969 under Part I of the Federal Power Act

(a) All applications for major projects (those in excess of 2,000 horsepower) or for reservoirs only providing regulatory flows to downstream (major) hydroelectric projects under Part I of the Federal Power Act for license or relicense, shall be accompanied by Exhibit W, the applicant's detailed report of the environmental factors specified in § 2.80 and 4.41. All applications for surrender or amendment of a license proposing construction, or operating change of a project shall be accompanied by the applicant's detailed report of the environmental factors specified in § 2.80. Notice of all such applications shall continue to be made as prescribed by law.

(b) The staff shall make an initial review of the applicant's report and, if necessary, require applicant to correct deficiencies in the report. If the proposed action is determined to be a major Federal action significantly affecting the quality of the human environment, the staff shall conduct a detailed independent analysis of the action and prepare a draft environmental impact statement which shall be made available to the Council on Environmental Quality, the Environmental Protection Agency, other appropriate governmental bodies, and to the public, for comment. The statement shall also be served on all parties to the proceeding. The Secretary of the Federal Power Commission shall cause prompt publication in the Federal Register of notice of the availability of the staff's draft environmental statement. Written comments shall be made within 45 days of the date the notice of availability appears in the Federal Register. If any governmental entity, Federal, state, or local, or any member of the public, fails to comment within the time provided, it shall be assumed, absent a request for a specific extension of time, that such entity or person has no comment to make. Extensions of time shall be granted only for good cause shown. All entities filing comments with the Commission will submit ten copies of such comments to the Council on Environmental Quality. Upon expiration of the time for comment the staff shall consider all comments received and revise as necessary and finalize its environmental impact statement which, together with the comments received, shall accompany the proposal through the agency review and decision-making process and shall be made available to the parties to the proceeding, the Council on Environmental Quality, and the public. In the event the proposal is the subject of a hearing the staff's environmental statement will be placed in evidence at that hearing.

(c) Any person may file a petition to intervene on the basis of the staff draft environmental statement. All intervenors taking a position on environmental matters shall file timely comments, in accordance with paragraph (b) of this section, on the draft statement with the Commission including, but not limited to, an analysis of their environmental position in the context of the factors enumerated in 2.80, and specifying any differences with staff's position upon which intervenor wishes to be heard. Nothing herein shall preclude an intervenor from filing a detailed environmental impact statement.

(d) In the case of each contested application, the applicant, staff, and all intervenors taking a position on environmental matters shall offer evidence for the record in support of their environmental position. The applicant and all such intervenors shall specify any differences with the staff's position, and shall include, among other relevant factors, a discussion of their position in the context of the factors enumerated in § 2.80.

(e) In the case of each contested application, the initial and reply briefs filed by the applicant, the staff and all intervenors taking a position on environmental matters must specifically analyze and evaluate the evidence in the light of the environmental criteria enumerated in § 2.80. Furthermore, the Initial Decision of the Presiding Administrative Law Judge in such cases, and the final order of the Commission dealing with the application on the merits in all cases, shall include an evaluation of the environmental factors enumerated in § 2.80 and the views and comments expressed in conjunction therewith by the applicant and all those making formal comment pursuant to the provisions of this section.

§ 2.82 Compliance with the National Environmental Policy Act of 1969 Under the Natural Gas Act.

(a) All certificate applications filed under Section 7(c) of the Natural Gas Act (15 U.S.C. 717f(c)) for the construction of pipeline facilities, except abbreviated applications filed pursuant to Sections 157.7(b), (c) and (d) of Commission Regulations and producer applications for the sale of gas filed pursuant to Sections 157.23-29 of Commission Regulations, shall be accompanied by the applicant's detailed report of the environmental factors specified in § 2.80. Notice of all such applications shall continue to be made as prescribed by law.

(b) The staff shall make an initial review of the applicant's report and, if necessary, require applicant to correct deficiencies in the report. If the proposed action is determined to be a major Federal action significantly affecting the quality of the human environment, the staff shall conduct a detailed independent analysis of the action and prepare a draft environmental impact statement which shall be made available to the Council on Environmental Quality, the Environmental Protection Agency, other appropriate governmental bodies, and to the public, for comment. The statement shall also be served on all parties to the proceeding. The Secretary of the Federal Power Commission shall cause prompt publication in the Federal Register of notice of the availability of the staff's draft environmental statement. Written comments shall be made within 45 days of the date the notice of availability appears in the Federal Register. If any governmental entity, Federal, state, or local, or any member of the public, fails to comment within the time provided, it shall be assumed, absent a request for a specific extension of time, that such entity or person has no comment to make. Extensions of time shall be granted only for good cause shown. All entities filing comments with the Commission shall submit ten copies of such comments to the Council on Environmental Quality. Upon expiration of the time for comment the staff shall consider all comments received and revise as necessary and finalize its environmental impact statement which, together with the comments received, shall accompany the proposal through the agency review and decision-making process and shall be made available to the parties to the proceeding, the Council on Environmental Quality, and the public. In the event the proposal is the subject of a hearing, the staff's environmental statement will be placed in evidence at that hearing.

(c) Any person may file a petition to intervene on the basis of the staff draft environmental statement. All intervenors taking a position on environmental matters shall file timely comments, in accordance with paragraph (b) of this section, on the draft statement with the Commission including, but not limited to, an analysis of their environmental position in the context of the factors enumerated in § 2.80, and specifying any differences with staff's position upon which intervenor wishes to be heard. Nothing herein shall preclude an intervenor from filing a detailed environmental impact statement.

(d) In the case of each contested application, the applicant, staff, and all intervenors taking a position on environmental matters shall offer evidence for the record in support of their environmental position. The applicant and all such intervenors shall specify any differences with the staff's position, and shall include, among other relevant factors, a discussion of their position in the context of the factors enumerated in §2.80.

(e) In the case of each contested application, the initial and reply briefs filed by the applicant, the staff, and all intervenors taking a position on environmental matters must specifically analyze and evaluate the evidence in the light of the environmental criteria enumerated in § 2.80. Furthermore, the Initial Decision of the Presiding Administrative Law Judge in such cases, and the final order of the Commission dealing with the application on the merits in all cases, shall include an evaluation of the environmental factors enumerated in § 2.80 and the views and comments expressed in conjunction therewith by the applicant and all those making formal comment pursuant to the provisions of this section.

FEDERAL POWER COMMISSION
RULES OF PRACTICE AND PROCEDURE
18 CFR 1.8 Intervention

"(a) Initiation of intervention. Participation in a proceeding as an intervenor may be initiated as follows:

(1) By the filing of a notice of intervention by a State Commission, including any regulatory body of the State or municipality having jurisdiction to regulate rates and charges for the sale of electric energy, or natural gas, as the case may be, to consumers within the intervening State or municipality.

(2) By order of the Commission upon petition to intervene.

(b) Who may petition. A petition to intervene may be filed by any person claiming a right to intervene or an interest of such nature that intervention is necessary or appropriate to the administration of the statute under which the proceeding is brought. Such right or interest may be:

(1) A right conferred by statute of the United States;

(2) An interest which may be directly affected and which is not adequately represented by existing parties and as to which petitioners may be bound by the Commission's action in the proceeding (the following may have such an interest: consumers served by the applicant, defendant, or respondent; holders of securities of the applicant, defendant, or respondent; and competitors of the applicant, defendant, or respondent).

(3) Any other interest of such nature that petitioner's participation may be in the public interest.

(c) Form and contents of petitions. Petitions to intervene shall set out clearly and concisely the facts from which the nature of the petitioner's alleged right or interest can be determined, the grounds of the proposed intervention, and the position of the petitioner in the proceeding, so as fully and completely to advise the parties and the Commission as to the specific issues of fact or law to be raised or controverted, by admitting, denying or otherwise answering specifically and in detail, each material allegation of fact or law asserted in the proceeding, and citing by appropriate reference the statutory provisions or other authority relied on: Provided, that where the purpose of the proposed intervention is to obtain an allocation of natural gas for sale and distribution by a person or municipality engaged or legally authorized to engage in the local distribution of natural or artificial gas to the public, the petition shall comply with the requirements of Part 156 of this chapter (i.e., Regulations Under the Natural Gas Act). Such petitions shall in other respects comply with the requirements of §§1.15 to 1.17, inclusive.

(d) Filing and service of petitions. Petitions to intervene and notices of intervention may be filed at any time following the filing of a notice of rate or tariff change, or of an application, petition, complaint, or other document seeking Commission action, but in no event later than the date fixed for the filing of petitions to intervene in any order or notice with respect to the proceedings issued by the Commission or its Secretary, unless, in extraordinary circumstances for good cause shown, the Commission authorizes a late filing. Service shall be made as provided in §1.17. Where a person has been permitted to intervene notwithstanding his failure to file his petition within the time prescribed in this paragraph, the Commission or officer designated to preside may where the circumstances warrant, permit the waiver of the requirements of §1.28(c)(5) with respect to copies of exhibits for such intervenor.

(e) Answers to petitions. Any party to the proceeding or staff counsel may file an answer to a petition to intervene, and in default thereof, may be deemed to have waived any objection to the granting of such petition. If made, answers shall be filed within 10 days after the date of service of the petition, but not later than 5 days prior to the date set for the commencement of the hearing, if any, unless for cause the Commission with or without motion shall prescribe a different time. They shall in all other respects conform to the requirements of §§1.15 to 1.17, inclusive.

(f) Notice and action on petitions

(1) Notice and service. Petitions to intervene, when tendered to the Commission for filing, shall show service thereof upon all participants to the proceeding in conformity with §1.17(b).

(2) Action on petitions. As soon as practicable after the expiration of the time for filing answers to such petitions or default thereof, as provided in paragraph (e) of this section, the Commission will grant or deny such petition in whole or in part or may, if found to be appropriate, authorize limited participation. No petitions to intervene may be filed or will be acted upon during a hearing unless permitted by the Commission after opportunity for all parties to object thereto. Only to avoid detriment to the public interest will any presiding officer tentatively permit participation in a hearing in advance of, and then only subject to, the granting by the Commission of a petition to intervene.

(g) Limitation in hearings. Where there are two or more intervenors having substantially like interests and positions, the Commission or presiding officer may, in order to expedite the hearing, arrange appropriate limitations on the number of attorneys who will be permitted to cross-examine and make and argue motions and objections on behalf of such intervenors."

F. Letters of Comment on the Draft Environmental Impact Statement

The Notice of Availability of the draft environmental impact statement (DEIS) was published and mailed to Federal, state, and local agencies and individuals for comments on or about February 26, 1982. Section 8 of the final environmental impact statement (FEIS) contains a listing of those agencies and individuals that were sent copies of both the draft and final environmental impact statements.

All timely letters of comment that address specific analyses in the DEIS were reviewed by Staff. Suggestions for correcting text or data and requests for further discussion of a subject have been given consideration. Those editorial changes and suggestions which were practicable, reasonable, and which improved the quality of the FEIS are incorporated herein.

Constructive criticism presenting a major environmental point of view or one in opposition to Staff, when persuasively supported, is treated by making revisions in the appropriate part of the FEIS. When the major point of view is not persuasive, reasons are given why Staff did not change its point of view.

The sections or pages of the final environmental impact statement that have been modified as a result of comments received are listed to the right of the letters of comments. Other FERC staff responses are self explanatory.

A "no response required" response is given to comments which are statements that raised no questions concerning treatment of subject matter in the environmental impact statement.

A "your opinion has been noted" or "your comment is noted" response is given to comments which are considered to be statements of opinions.

The respondents and the page on which their letter occurs are:

	Page
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Idaho Power Company	F-7
Department of the Army, North Pacific Division, Corps of Engineers	F-38
U.S. Department of Agriculture, Forest Service	F-39
Mr. Charles A. Wellner	F-40
U.S. Department of Agriculture, Soil Conservation Service	F-41

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Dr. Harold E. Malde	F-113
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Ms. Mary Kirkwood	F-131
Mr. William K. Chisholm	F-132
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Daniel A. Ness, Friends of the Snake River	F-141
Mr. J. Casey Meredith	F-146
Dr. Larry D. Guldberg	F-148
Mr. Peter Bowen	F-152
Mr. Terry Melton	F-153
Mr. John F. Sollers	F-154
Grace N. and John F. Sollers, Sr.	F-155
Phyllis and Bert Burda	F-156
Ms. Jill Joseph	F-157
Idaho Department of Fish and Game	F-159
C.E. and Mary E.S. Joseph	F-161
Mr. Jeffrey Cook	F-165
Ms. Jean Elle	F-167
U.S. Department of the Interior	F-168
John R. Swanson--poor original; letter illegible	F-174
Bonneville County Sportsmen's Association	F-175
Idaho Environmental Council	F-177

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U.S. Environmental Protection Agency F-182

Dr. David R. Peck F-184

Several letters of comment included attachments. These attachments have not been reproduced; copies are available from the Division of Public Information of the FERC.

IDAHO STATE HISTORICAL SOC'ETY
610 NORTH JULIA DAVIS DRIVE BOISE, IDAHO 83706

STATE MUSEUM

March 22, 1982

Mr. Thomas W. Russo
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

Dear Mr. Russo:

We have received and reviewed the Draft Environmental Impact Statement for the A. J. Wiley Hydroelectric Project (FERC No. 2845 Idaho).

We agree with the description and analysis of cultural resources to be impacted as a result of the project and support the mitigative measures proposed on page 4-31 of the document.

Sincerely,

Thomas Green
State Archaeologist
State Historic Preservation Office

No response required.

IDAHO DEPARTMENT of PARKS & RECREATION
Statehouse Mall, 2177 Warm Springs Ave., Boise, Idaho 83720
(208) 334-2154

Dale R. Christiansen, Director
Robert L. Meinen, Deputy Director

John V Evans, Governor

File Ref. #543.10.2K

April 7, 1982

Received 4-13-82

Mr. Thomas N. Russo
Federal Energy Regulatory
Commission
825 N. Capitol St., N.E.
Washington, DC 20426

Dear Mr. Russo:

We are pleased to have the opportunity to comment on the DEIS for the proposed A. J. Wiley hydroelectric project. We hope that our comments will be helpful to FERC in its processing of this licensing application.

Reviewing the applicant's proposed recreation mitigation plan (pp. 2-7 to 2-12) we find that actual recreation development is somewhat minimal. At the Wiley Damsite, Wiley Reach South, Wiley Reach North, and Lower Salmon Falls Dam, essentially no recreation facilities are being provided. These "recreation sites" would appear to be primarily access sites. The Malad River site shows "swimming access." We are uncertain whether "swimming access" means a developed beach or something less.

Based upon the 1977 SCORP, swimming beaches, picnic areas, and boat launches are in demand for this region of the state. We do not, however, anticipate heavy use of these facilities. Developments on the many other Snake River impoundments in South Central Idaho have greatly reduced the need for additional flatwater recreation opportunities. Currently, the Bureau of Reclamation is upgrading similar facilities at Lake Walcott and Twin Falls County is providing new facilities at Murtaugh Lake. To adequately assess the demand for the applicant's proposed facilities, a brief reassessment of recreation needs should be performed before this EIS is adopted. This department would be willing to cooperate with FERC or Idaho Power in doing this reassessment.

On p. 3-37, the statement is made "The Thousand Springs area of South West Idaho provides a diversity of natural water forms that serve as the focal point for many outdoor recreational activities." We do not consider this discussion of water based recreational opportunities to be complete without mention of the accelerating homogenization of these "many outdoor recreational activities." River boating, stream fishing, and appreciation of the natural environment are becoming fatalities to hydro development and aquaculture. The water resource of the Thousand Springs area consists increasingly of flatwater.

The recreational plan (Exhibit R) included as part of the application for license indicates that swimming would be provided for by dredging a small area on the north bank of the reservoir. Staff considers that this would be somewhat less formal than a developed beach area.

Applicant included such an assessment in the Exhibit R and determined that recreational development should emphasize access-type facilities. Staff considered this concept to be appropriate, considering the narrow, linear aspect of the proposed project, the importance of the terrestrial-resources mitigative programs, and the availability of other developed recreational opportunities in the vicinity. Staff would consider any further comments that DPR might have on the Exhibit R.

Your opinion has been noted.

On p. 3-38, mention is made of the Salmon River near Stanley being the closest recreational substitute for the Wiley reach of the Snake. While this is certainly true, the Salmon has a shorter use season and only relatively short sections (some stretches above Stanley and the stretch from Torrey's to the confluence of the East Fork) of comparable boating difficulty (Class II-III). Significant parts of the upper main Salmon (Upper Stanley to Sunbeam Dam and Sunbeam Dam to Torrey's) are very difficult (Class IV) and require advanced boating skills. The DEIS should recognize this.

On p. 4-25, the recreational limitations of the proposed Wiley Reservoir are recognized. It is stated that fishing and hunting will be the main recreational uses of the reservoir and environs. Fishing and hunting opportunities exist at present at a level of quality which is probably higher than would be after impoundment. In addition, flatwater recreation opportunities would probably not be in sufficient demand to make up for the whitewater boating opportunities which would be lost. From a recreational point of view, this project will result in a net loss of opportunities. The EIS should clearly recognize this net loss.

We agree with the statements on p. 5-11 to the effect that the proposed reservoir recreation facilities are not mitigation for the loss of river recreation opportunities. We also agree with FERC's recommended concept of working cooperatively with Idaho Power to preserve some of the natural features of the Thousand Springs area. We feel, however, that Malad Canyon and Box Canyon are already or will soon be sufficiently environmentally degraded to reduce their utility as sites for such efforts. A few major, ecologically intact springs still exist in the Thousand Springs area, however. We would be very interested in working with the applicant to preserve one or more of these springs.

The EIS or dam licensing instrument needs to recognize that any mitigative interest acquired in these springs positively and absolutely must include water rights. In the past, when we worked with a private organization on a spring site acquisition in this area, they sold the water rights to a third party immediately before making the agreed upon land transfer to this agency, presenting us with a piece of property with very limited recreational utility.

We hope that these comments are helpful. Please feel free to contact us if we can be of further assistance.

Sincerely,

DALE R. CHRISTIANSEN
DIRECTOR

Todd Graeff
State Trails Coordinator

mm

See revised Section 3.1.6.2.

Your opinion has been noted. The extent to which some recreational opportunities might be lost would be directly related to the success of the mitigative plan for aquatic and terrestrial resources; however, the substitution of additional flatwater recreational opportunities for scarce river recreation, such as white water boating, would not appear to be appropriate mitigation for the loss of river-related recreational opportunities.

Staff offered Malad Canyon and Box Canyon as possible mitigative areas, since both sites had been proposed for potential National Natural Landmark status, as had the Wiley Reach, and both sites were known to Staff. In addition, Staff recognized the integral relationship of the Malad Canyon to the state park located on its rim. Staff did not intend to restrict consideration to Malad Canyon and Box Canyon, however, especially if more suitable sites are available.

The acquisition or appropriation of water rights for recreational purposes or to protect aquatic resources would have to be in accordance with Idaho state law, and should be resolved during the consultation period. Any mitigative program agreed to would be considered by Staff for recommendation as a condition of any license issued.

SNAKE RIVER
HYDRO POWER

IDAHO POWER COMPANY

BOX 70 • BOISE, IDAHO 83707

April 16, 1982

OFFICE OF THE SECRETARY
'82 APR 19 PM 1:41
FEDERAL ENERGY
REGULATORY COMMISSION

Mr Kenneth F Plumb
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street
Washington, D C 20426

RE: A J Wiley Hydroelectric Project,
FERC No 2845 - Idaho, Draft
Environmental Impact Statement
(FERC/EIS-0031/0)

Dear Mr Plumb:

The following are Idaho Power Company's (Applicant) comments to the Draft Environmental Impact Statement (DEIS) issued for the A J Wiley Project No 2845:

GENERAL COMMENTS

1. Bliss Bridge Damsite Alternative:

Most of the geologic interpretations and recommendations by Staff seem to be based on data given in H E Malde's U S Geological Survey Reports of 1968, 1971 and 1981. A minimum of attention and/or reference has been given to important additions and modifications to Malde's geologic base data submitted by the Applicant in reports of 1978 through 1981.

Staff has considered all sources of information, primarily reports submitted by the Applicant, including Stearns (1954), and reports that provide site-specific information.

Applicant has evaluated Staff's economic analysis shown in Table 1-12 and used as support for its conclusion that "changing the location of the proposed A J Wiley Dam to the vicinity of Bliss Bridge would result in an additional saving of $3.24 million annually over the A J Wiley Project for a 50-year period". Page 5-15. Applicant and its outside consultants have for-

See revised Section 1.3.5, Summary, and Conclusions.

mulated their own economic comparison of the proposed project with the most feasible and economical alternatives following the format of Table 1-12, attached hereto as Supplement C. This comparison indicates the actual saving of the Bliss Bridge Alternative would be approximately $100,000 in annual costs based on a 50-year present worth. (An amount within the accuracy margin of cost estimates for this stage of design.) Since the sites are economically similar, the additional annual generation available at the Wiley site makes it the desirable site. Therefore, Staff's conclusions regarding the Bliss Bridge Alternative Site should be reconsidered.

Specific comments contained herein are taken directly from independent consultant responses, with Applicant concurrence, to the DEIS. The comments which relate to the geology, soils, foundations, or structures represent the opinions and recommendations of independent consultants International Engineering Company, Inc.; Mr Charles S Content, Consulting Engineering Geologist; Mr George A Kiersch, Geologic Consultant; and the Staff of the Applicant.

No response required.

2. Wildlife and Fisheries Mitigation Plan:

Staff states that it generally concurs with the Wildlife and Fisheries Mitigation Plan proposed by the U S Fish and Wildlife Service and the Idaho Department of Fish and Game. Applicant has previously commented on the proposed plan, and hereby incorporates by this reference its letter of December 17, 1981, as contained in Appendix C. Applicant will continue to work with the concerned agencies to develop a mutually satisfactory mitigation package.

No responses required.

Staff suggests that Applicant "protect a portion of the remaining Shoshone sculpin habitat through acquisition of a spring. (Page 5-9, Section 5.2.1.3(4)).

Staff also suggests that Applicant "consult with the U S Department of Interior, the Idaho Departments of Fish and Game and Parks and Recreation concerning the protection of Malad Canyon and Box Canyon as partial mitigation for the loss of existing natural values at the proposed project." (Page 5-11, Section 5.2.1.6).

Applicant has recently met with the U S Fish and Wildlife Service, the Bureau of Land Management, and the Idaho Departments of Fish and Game, Parks and Recreation, and Water Resources and representatives from Idaho State University, concerning the Shoshone sculpin. These meetings were held on January 12 and February 23, 1982. The extent and frequency of Shoshone sculpin habitat was discussed as well as analyzing the legal ability of Applicant to protect a portion of the remaining Shoshone sculpin habitat through acquisition of a spring.

Under the Constitution and laws of the State of Idaho, Applicant is legally unable to prevent the appropriation for a beneficial use of the unappropriated public waters of the State of Idaho. Article 15, section 3, Idaho Constitution. Afforded with this right to appropriate the unappropriated public waters is the right to condemn private property for rights of way for the construction of canals, ditches, flumes or pipes to convey water to the place of use. Article I, section 14, Idaho Constitution, Sections 7-701 and 42-1106, Idaho Code. Applicant could attempt to acquire lands surrounding or near a "spring", but would be unable to appropriate the waters of a spring to preserve Shoshone sculpin or prevent the diversion of those waters for other

As Applicant and others have pointed out, both water rights and land rights must be present to ensure the continued presence and maintenance of the riparian ecosystem. There would seem to be a number of approaches possible under Idaho water law to provide water rights for the protection of aquatic resources, recreation, and other public uses. IDFG, in its April 30, 1982, letter of comment on the DEIS, proposed the incorporation of land ownership by Applicant and the protection of minimum flows by state action. Another method might be the acquisition and conveyance of certain water rights for public purposes. Cooperative efforts by the private and public interests should determine the appropriate mix of responsibilities and mechanism to achieve mitigation goals.

uses over and across its property. Thus, it would be fruitless to acquire land surrounding a "spring" for Shoshone sculpin habitat protection when the water in the spring would be subject to depletion through diversion and use for other purposes and at points outside the land areas surrounding the spring.

This same analysis applies to the concept of protecting the Box and Malad Canyons as partial mitigation for the loss of existing natural values at the proposed project. Applicant currently owns adjoining lands to the Malad River all as required by and for the operation of the Upper and Lower Malad Project No 2726. This ownership has not prevented attempts to appropriate the remaining public waters of the Malad River.

Lands within Box Canyon were sold by the Applicant in 1969. Also, Box Canyon is currently the subject of recent legislation clarifying the future private and public use of its waters. (Idaho House Bill No 786.) This statute provides that certain waters within Box Canyon are "desirable for natural scientific studies and limited recreation for the citizens of the State of Idaho" while at the same time providing for the exclusion of other downstream lands and waters within the canyon from the operation of the statute.

To summarize, land ownership does not prevent others from appropriating the public waters of Idaho. "Protection" of these waters and related habitats and values would be beyond the legal authority of the Applicant. Subject to prior appropriations, that authority lies with the State. Section 42-1501, et seq. Idaho Code. To the best of Applicant's knowledge, waters which appear to retain Shoshone sculpin habitat values and the waters of the Malad River and Box Canyon are "public" waters of the State of Idaho. Thus, Applicant could not satisfy any condition in a license that contemplates the protection or prevention of the use of the public waters of the State. To require agency consultation concerning such a concept would likewise be fruitless.

Applicant will continue to work and consult with the various agencies on these wildlife and fisheries mitigation issues, but with the clear understanding that the Applicant is legally constrained from accomplishing or effectuating some of the stated goals.

Specific Comments:

1. Cover Sheet, Paragraph C. Abstract: The proposed generating capacity of the Project is about 86 MW.

2. Summary - Page 1, Paragraphs 1 and 3: The filing date of the Application was August 28, 1980.

In paragraph 3 the modifier "about" should be inserted before the 86 MW installed capacity figure, and "net" should be inserted in the last sentence before "annual energy generation".

3. Summary - Page 2: Throughout the development and text of the DEIS, Staff has consistently referred to the Wiley Reech of the Snake River as ". . . one of the last free-flowing reaches of the Snake River in South-Central Idaho". This statement is misleading when compared to the Snake River as a whole.

Of the 780 miles of the Snake River located in Idaho, approximately 65 percent is in a free-flowing condition. 67.5 miles of the river is classified as wild or scenic. Furthermore, Idaho presently contains approximately 1200 miles of river which are under study for inclusion in the National Wild and Scenic River system. The Wiley Reach, nominated after the proposed project

See revised Cover Sheet (Abstract), paragraph e.

See revised Summary.

See revised Summary for further characterization of the free-flowing nature of the Wiley Reach.

Staff does not believe that any free-flowing section of the Snake River, or any other river in Idaho, could be considered as substitutes for one another. Each section has its own character. As evidenced by its listing in the Nationwide Rivers Inventory, the Wiley Reach has attributes not shared equally by other free-flowing sections in the Upper Snake River Basin. Staff notes that many of the free-flowing sections in the Upper Snake River Basin, particularily from Milner downstream to C.J. Strike Reservoir, are also being considered for hydroelectric development.

became public knowledge, represents less than 0.7 percent of this river mileage presently under study.

Remaining sections of the Snake River, from Palisades Dam to Idaho Falls, from American Falls Dam to Lake Walcott, from Minidoka Dam to Upper Salmon Falls Reservoir, from Bliss Dam to C J Strike Reservoir, from C J Strike Dam to Swan Falls Reservoir, from Swan Falls Dam to Brownlee Reservoir and from Hells Canyon Dam to its egress from the State of Idaho, all remain free flowing and afford whitewater boating opportunities of the highest quality.

Additionally, the State of Idaho contains 437 miles of rivers which are protected under the Wild and Scenic River System. This includes two of the three major rivers of the State. Wilderness rivers are not in short supply within Idaho.

In recent testimony presented to the Pacific Northwest Power Planning Council by Mr Kenneth Dunn, Director of the Idaho Department of Water Resources, (March 23, 1982) the Department pointed out the fundamental water supply limitations found in some sections of the Columbia Basin, particularly the Snake River. In his testimony, Mr Dunn emphasized that the limited water supplies in the Snake River are utilized by a multitude of beneficial uses, and are the single most important factor to Idaho's economic well being. The Department's testimony underscores the importance of the Snake River as the "working river" of Idaho. Staff should consider this perspective in discussing the proposed project.

4. Summary - Page 3 - Paragraph 2: Staff's general concurrence with agency recommendations on the Fish and Wildlife mitigation plan is inappropriate. Agency plans cited on Page C-8, Paragraphs 2 and 4 of the DEIS recommends the planting of 20,000 catchable rainbow trout, 55,000 fingerling rainbow

The fact remains that the Wiley Reach flows for approximately 8 miles through a riverine ecosystem providing habitat for a diversity of aquatic, wildlife, and botanical species, some of which are rare; that the river provides year-round recreational opportunities that are uncommon in the area; and that the Wiley Reach is proximate to a significant number of Idaho citizens. These are some of the beneficial uses of the river, including hydropower, that should be considered.

Staff believes that this perspective has been discussed adequately. See Section 1.1, 1.2.2.1, 1.3, and 3.1.3.1.

Because of the uncertainty concerning what type of fishery would be most suited to the conditions that would exist in the proposed Wiley impoundment, Staff believes the best approach to determining mitigation is to stock the species recommended by state and Federal resource agencies. Subsequent monitoring of the populations would allow determination of which species is best suited to the new reservoir conditions. (See revised Sections 4.1.4.1 and 5.2.1.4.)

trout, 55,000 fingerling brown trout as well as 100,000 fingerling each of black crappie and smallmouth bass. As noted on Page C-18, Paragraph 1, Applicant agreed to study a warmwater/coldwater fishery, but Staff must realize that the planting of all the species recommended without first determining interspecific relationships could be counter-productive. Applicant believes the "shotgun" approach of indiscriminate planting may result in a fishery relying on this approach for maintenance; it will not determine which type of fishery, by itself, is best for the A J Wiley Reach.	
5. Summary - page 3 - Paragraph 3: Applicant's previous comments in response to agency letters indicate that the Applicant is willing to modify the mitigative plan where appropriate and has suggested specified species to be used in the mitigation effort.	Comment noted. Although Applicant has expressed a willingness to modify the mitigative plan, Staff believes it is necessary for Applicant and the agencies to formulate a comprehensive mitigative plan outlining the specific goals, methods to be utilized, monitoring methods, and agreed-upon species to be used.
6. Page 1-1 - Paragraph 3: The Applicant proposes to utilize a maximum of 15,000 cubic feet per second, rather than 17,000 cubic feet per second of water through the turbines for power generation.	See revised Section 1.1.1.
7. Page 1-2 - Paragraph 2: It is a well known fact that the Snake River above the Wiley Reach is extensively developed for irrigation, flood control and hydro power generation. However, Staff must realize that from the Wyoming border to the Wiley Reach, a large percentage of the Snake River remains in a natural state.	No response required.
8. Page 2-15 - Paragraph 6: Excavation on the left abutment and in the river channel would be completed 4 months, rather than 3 months, after Phase II diversion.	See revised Section 2.1.4.
9. Page 2-17 - Paragraph 1: The first unit would be on-line 41 months after the start of final design and 24 months after award of the construction contract, rather than 41 months after the start of construction. All three	See revised Section 2.1.4.

units would be on-line 45 months after the start of final design, rather than after the start of construction.	
10. Page 2-18 - Paragraph 3 and 4: The results of the latest seismic risk evaluation is presented in the report of October, 1981 entitled, A J Wiley Hydroelectric Project, Seismicity Study. This study considered regional seismotectonics and the historical seismic records within a 300km diameter circle centered at the Wiley damsite. A total of 858 events were reported by the NOAA Earthquake Data File for the time period between 1872 and 1980. There was evidence to indicate that there was a remote possibility of a significant seismic event occurring within 20km of the damsite that could produce a peak horizontal acceleration of 0.15g. Accordingly, this much more conservative seismic design coefficient is proposed.	No response required.
11. Page 2-21 - Paragraph 4: The proposed grout curtain through the pillow lava and older alluvium in the right abutment would be 2400 feet long and consist of 3 rows of holes staggered on 10 foot centers. The grout curtain will be a significant cost item, but is not believed to be unusually difficult to construct. The pillow lava is usually referred in the DEIS as "highly permeable." Of the 68 permeability tests in this material, 60 percent were on the order of $1x10^{-4}$ cm/sec. Twenty-four percent of the tests gave lower values and 16 percent gave higher values. The highest permeability value obtained was $1x10^{-2}$ cm/sec. A grout curtain should be constructed, but Applicant does not anticipate excessively high grout take or difficulty in obtaining an acceptable cut-off. (See Supplement A.)	No response required. Stearns (1954) stated that water tests of sections of the formation are not representative of the formation as a whole. In most of Applicant's drilling, the holes were kept open by use of drilling mud or casing. Once drilling mud has been introduced into a hole, it is almost impossible to obtain accurate permeability test results.
12. Page 2-21 - Paragraph 5: The unit costs used in the estimate are based on the premise that suitable materials are readily available within a convenient distance of the construction site. The values used are in line with	Staff did not realize that the cost of obtaining embankment material was listed under excavation in Applicant's cost estimate (Idaho Power Company, 1981b, Application, Exhibit N). Comparision of Applicant's estimate with the Corps of Engineers' estimating guide and with comparable projects show that Applicant's estimate of embankment cost is reasonable, and the estimate is adopted by Staff. See revised Section 1.3.5.

bids received on a number of comparable earthfill dams, including projects in which International Engineering Company, Inc., has been involved and other projects reported in the Daily Construction Service. (See Supplement B.)	
13. Page 2-22 - Paragraph 2: The Bliss Bridge Alternative Project would inundate about 500 acres of land and river area, rather than 490 acres.	See revised Section 2.2.1.
14. Page 3-2 - Paragraph 5, Page 3-3 Paragraphs 1, 2 and 3, and Appendix B: Applicant and its outside Consultants do not agree with H E Malde's theory that the only path of outflow from Root Lake was through the pillow lava, and that it was not until the Root Lake clay deposits reached an elevation of 3,150 feet that the pillow lava was sufficiently sealed to cause the lake to overflow. Our interpretation is as follows:	Your opinion has been noted.
By late Pleistocene time, eruption of the McKinney Basalt began from a vent 9 miles northeast of Bliss. At this time the floor of the ancestral Snake River Canyon was approximately 80 feet below its present elevation. Subaerial flows of McKinney Basalt spread southwest from McKinney Butte and completely buried the ancestral Wood River Canyon, as well as the Snake River Canyon from its junction with the Wood River downstream to and beyond today's Bancroft Springs. This damming of the Snake River created a temporary lake, and large amounts of lava from subsequent flows spilled into the lake and formed McKinney pillow lava. The pillow lava facies consists of thick masses of ellipsoidal lava and brecciated boulders and cobbles which are intermixed with debris slides of the Lava and mud flows of clayey-silt and localized beds of compact glassy sands. Also included in this McKinney Basalt unit are	Your interpretation has been noted.

alluvial basaltic sands which began accumulating as high as elevation 2,940 before the lava dam was breached and a new channel was cut downstream from the blockage.

After downcutting of the new channel, the area may have been reinundated by a second larger lake that was possibly formed by temporary damming of the river at some point downstream of the previous dam. Lacustrine clays called Root Lake Sediments, may have accumulated in the lake basin as high as elevation 3,180 before eventual downcutting by the river drained the lake and exposed the sediments to erosion. Erosion may have removed a substantial amount of the clays within the confines of the canyon leaving only scattered erosional remnants; however, a vast amount of sediments are still found on the upland plateaus below elevation 3,180 and as far downstream as Hammett.

At no time during geologic investigations, was any evidence that the pillow lava was capable of transmitting a large volume of water found. As mentioned previously, our water pressure tests showed the material to range from medium to very low permeability with the majority of tests falling in the low to very low range. These test results are supported in a qualitative way by the appearance of outcrops and core samples.

Staff has apparently accepted the theories of Mr H E Malde as presented in his 1981 Open File USGS Report 81-569. In this report, Mr Malde starts with the premise that pillow lava. . ." is one of nature's most porous materials" and goes on to develop his theories with no regard to conflicting factual evidence. The Malde/Staff description of the McKinney Unit may not

Your interpretation has been noted.

Stearns (1954) found the pillow lava to be very permeable. Stearns noted that because of the difficulty of permeability testing and the fact that the whole section could not be tested, those tests that could be made were not representative of the formation as a whole. Based on drilling methods described in the logs of more recent testing, Staff believes that those permeability data are not representative of the whole section of the formation that would be affected by the project.

Staff's analysis is based on all sources of data, including Stearns' 1954 report.

Your interpretation has been noted.

accurately represent the original composition of the material filling the ancestral Snake River Channel. For example, it is not reasonable that most of Root Lake water was released by flow through McKinney Pillow Lava-filled ancestral channel. This is forecasted during the time lake sediments were deposited against and on these lavas (prior to subsequent breaching). If the pillow lava is as permeable as Mr Halde assumes, it is questionable that clay deposits could have formed at all. It is more likely that the clay would have been washed through the "open-textured volcanic deposit" by the postulated 10.5 million acre-feet per year that he says flowed through the pillow lava. It is also not reasonable to accept the theory that the seepage was not reduced sufficiently to cause overtopping of the dam until the lake was filled with clay to elevation 3150 feet. This would mean that the pillow lava would have been blanketed by an extremely low permeability clay layer that would have been on the order of 500 feet thick at its deepest point.

Your interpretation has been noted.

There may also be other potential avenues of escape for the water from Root Lake, such as, through materials filling old channels beneath such flows as the Madson Basalt.

Your opinion has been noted.

15. Page 3-5: The Older Alluvium is included in the list of permeable formations. Water pressure tests of this formation gave an average value of 1x10^{-5} cm/sec which is in the very low permeability range.

Some would interpret this value to be moderate. The entire formation was not tested. Sand, gravel, cobble, and boulder layers (see Table 3-1) would be expected to be permeable.

16. Page 3-10 - Paragraph 3: The Upper Banbury Basalt has been altered and is prone to rapid weathering at some locations, but the rock at the damsite is unaltered and durable.

See revised Section 3.1.2.3.

17. Page 3-27 - Paragraph 2: This paragraph describes the population dynamics of the white sturgeon in the Wiley Reach. It states that the white sturgeon population in the Wiley Reach is "severely depressed". Simply stated

Your opinion has been noted.

the Cochnauer and Lukens studies indicate that reproduction of the white sturgeon is lacking in the Wiley Reach and loss of the remaining white sturgeon is inevitable.

18. Page 3-31 - Paragraph 2: It is indicated that "Hackberry stands are unique and do not reach tree size anywhere else in Idaho". Applicant offers the following quote from the "Final Environmental Impact Statement and Comprehensive Management Plan - Hells Canyon National Recreation Area" dated May 28, 1981, at page 47, for Staff consideration:

> "An important feature of the Snake River riparian zone is the dominance of the Hackberry, Celtis reticulata. It is the most common tree along the Snake River but is a disjunct species, occurring a considerable distance from its main range in the Southern Rockies..."

19. Page 3-35: Proposed Candidate Species: Staff notes that, of the three plant species listed, one, Astragalus purshii var. ophiogenes, has been found to be more widespread than previously thought and the Fish and Wildlife Service is recommending that the plant be dropped from candidate status.

Of the remaining two, A. atratus var. inseptus, occurs in Blaine, Camas and Lincoln counties, Idaho, in a topographic feature known as the Bennett Hills, with all known collection sites located several miles north of the project area.

The third species, Erigeron latus, enjoys the same status as A. atratus, except that most known collections of this species are located in Owyhee County, Idaho, well outside the project area.

20. Page 3-44 - Paragraph 3: The author's subjectivity is clearly shown through this paragraph and is inappropriate in a supposedly objective descrip-

See revised Section 4.1.5.1.

Upon earlier investigations into the occurrence of Celtis reticulata in Idaho, Staff found references to the presence of hackberry along the Snake river in the Hell's Canyon area; the hackberry discussed, however, was Celtis Douglasii. One of the most extensive surveys of riparian vegetation in the area, the Inventory of Riparian Habitats and Associated Wildlife Along the Columbia and Snake Rivers, published by the U.S. Army Corps of Engineers in 1976, lists the presence of C. Douglasii. Hitchcock and Cronquist, in their 1973 Flora of the Pacific Northwest, however, now lump C. Douglasii under C. reticulata, and the stands in Hell's Canyon are considered to be C. reticulata. The statement that C. reticulata is the most common tree along the Snake River should be considered in the context that there are not many trees in the area. The C. reticulata stands in the Wiley Reach are still important because (1) the stands are of native, woody riparian vegetation, which is rare in the state, and (2) the stands and trees are possibly the largest in southeastern Idaho and are of good size when compared to the C. reticulata stands in the Hell's Canyon area. See revised Section 3.1.4.1.

According to the 1981 Vascular Plant Species of Concern in Idaho, Astragalus atratus, var. inseptus occurs in Blaine, Camas, Lincoln, and possibly Elmore and Gooding Counties, and on the U.S. Endangered Species Distribution File published by Brookhaven National Laboratory under contract to FWS, as occuring in Gooding County.

Erigeron latus is on the latter list as occuring in Twin Falls Country. Upon FERC's request, under Section 7(c) of the Endangered Species Act, these two species were identified by the FWS as possibly occuring in the project area. Although most of the collections for these two species are outside of the immediate project area, there is a possibility that they could occur in the proposed project area.

Your opinion has been noted.

tion of the visual resources of the project area. This paragraph should be stricken in its entirety.	
21. Page 4-5 - Paragraph 1: The potential for seepage through the McKinney Pillow Lava is less than indicated.	Staff will assume high potential for seepage through the McKinney Pillow Lava until suitable testing has been made to show otherwise.
22. Page 4-5 - Paragraph 2: The Older Alluvium is presently saturated. It is not correct to say that it . . . "could become very unstable if brought in contact with water . . ."	Staff agrees. See revised Section 4.1.3.1.
23. Page 4-5 - Paragraph 3: It is not believed there is any danger of rapid deterioration of the Upper Banbury Basalt at the damsite. This Rock has been exposed in open cut at the dam site since 1954 and the unit in question has not deteriorated in that time.	Only a portion of the unit has been exposed. The present conditions are not project conditions. Final determination, under project conditions, of the weathering characteristics of the entire part of the unit that would be affected by the project cannot be made until the entire affected part of the unit has been tested.
24. Page 4-8 - Paragraph 1: It is believed that a suitable cut-off of the buried Snake River channel will be achieved. Seepage and attendant downstream spring-induced bank slumping should not be included under this heading.	See Revised Section 4.1.3.3.
25. Page 4-14 - Paragraph 2: Staff states that the resulting assemblage of fish, invertebrate species and plants in the proposed Wiley reservoir would likely resemble that of the Bliss Pool. Although portions of the Wiley reservoir may resemble the Bliss reservoir, other portions will not. The Wiley Reach possesses areas which have been previously identified by the Applicant as having great potential for development of high quality wildlife habitat, unlike the limited Bliss Pool.	See revised Section 4.1.5.1.
26. Page 4-14 - Paragraph 4: Staff states that rearing habitat would be reduced for the already limited sturgeon population. The existing sturgeon population in the Wiley Reach of the Snake River is considered to be lost (see Comment 17). The Cochnauer and Lukens	Your opinion has been noted.

studies indicate that the opportunity for reproduction is so slight that reproduction will not occur.

Applicant doubts that a reduction in recreational use of the Wiley Reach by anglers would be expected with the formation of Wiley Reservoir. A well planned fish stocking program may well increase the recreational use of the Reach by anglers.

27. Page 4-18 - Paragraph 1: Staff states that noise from blasting may be channeled through the canyon and sensitive species such as nesting raptors could temporarily leave their nests or desert them permanently.

Nesting raptors in this section of the river are located a considerable distance from the construction site. It is highly unlikely that construction activity would adversely affect these birds in any way.

28. Page 4-20 - Paragraph 1: Staff states that after the Wiley Reach riparian "habitat is inundated there is little riparian habitat adjacent to the Wiley Reach available to wildlife. The potential survival for displaced wildlife is therefore small."

As the mitigation effort is devised, implemented and established, habitat approximately equal to that presently in existence will be established. Therefore, adverse affects of loss of habitat will be temporary in nature.

29. Page 4-24 - Paragraph 1: The design of the transmission line includes the required phase-to-phase and phase-to-ground electrical clearance which does and will preclude any electrocution hazards to raptors or other large birds.

The installation of raptor nesting platforms on the proposed powerlines would be inappropriate. The habitat through which the transmission line will pass is not amenable to the inducement of raptor nesting. Any structures

Schmidt's survey of anglers on the Wiley Reach indicated that about two-thirds preferred to fish the river rather than a nearby reservoir (Schmidt, 1980b). It seems likely that a significant part of any increased fishing demand at the proposed Wiley Reservoir would come at the expense of existing reservoir fishing opportunities.

Figure V1-10 of the Applicant's Exhibit W (Idaho Power Company, 1981b, Application) shows nesting raptors on the north rim downstream of the proposed damsite. Staff believes the potential for the disturbance of nesting raptors exists.

No response required.

Staff believes that the survival of displaced wildlife depends on the implementation of the mitigation plan before construction and the quantity and quality of the habitat at the time of construction and inundation.

These statements reflect the Applicant's proposed mitigative measures in the Exhibit S. Any changes would have to be included in a revised Exhibit S.

mounted on the transmission line would therefore not be useful for birds of prey.

30. Page 4-25 - Paragraph 3: See comment No 29 above.

See response above.

31. Page 4-26 - Paragraph 3: Staff states that "riparian zone recreational opportunities would be diminished."

The loss of this type of recreational opportunity will be temporary. Riparian habitat and the opportunity for riparian zone recreational use will be re-established along the reservoir boundary as mitigation efforts take affect.

Your opinion has been noted.

32. Page 4-20 - Paragraph 2: Staff states that "riparian vegetation would re-establish itself but not to the same extent as presently exists."

With the development of a sound mitigation program, riparian vegetation should be re-established to virtually the same extent as presently exists in the reservoir area.

See revised Section 4.1.9.1. Staff agrees that the aim of any mitigative program should be to replace the lost riparian habitat as closely as possible in terms of acreage, species composition, and structural and functional components.

33. Page 4-29 - Paragraph 1: Applicant has re-evaluated the proposal to provide some native tree and shrub planting at the base of tower structures. The proposed transmission line is to be located in an area that is susceptible to range fires. Applicant proposes not to plant native tree and shrubs at the base of tower structures which may increase the fire danger and reduce the reliability of the line.

See revised Section 4.1.9.2.

34. Page 4-33 - Paragraph 2: Applicant believes local residents who presently use the Wiley Reach of the Snake River for recreational opportunities will generally continue to use the Wiley reservoir for recreational opportunities, even though the recreational activities would not be associated with a free-flowing river.

Applicant's Recreation Survey indicated that over 75 percent of the recreational use on the Wiley Reach was river fishing and river floating (Idaho Power Company, 1981e). Considering the present reservoir recreational opportunities immediately adjacent to the Wiley Reach, which are presumedly as accessible to local citizens as opportunities on the river, if not more so, it would be difficult to project the numbers of present river recreationists who would switch to reservoir recreational use.

35. Page 4-35 - Paragraph 4: Removal of part or all of the Bliss landslide material below reservoir elevation would not be advisable because this

would probably reduce the stability of the remaining material. Applicant is unable to find this recommendation in any of the reports submitted, but if suggested, such a suggestion is hereby retracted.	The suggestion was made in the Applicant's letter to the Commission dated June 26, 1981, as part of Supplemental Response No. 3. The retraction is noted. See revised Section 4.2.1.2.
36. Page 4-65 - Paragraph 3: The second and third sentences of the first paragraph should be modified to read: . . . The project would utilize the Kinetic energy in falling water and generate a net increase of 485 Gwh of electric energy annually under average streamflow conditions. The net minimum and maximum energy generated . . . . . (Emphasis added to indicate inserted words.)	See revised Section 4.8.1.
37. Page 5-1 - Item 5: See Specific Comment No 3 above.	See revised Section 5.1.1.1.
38. Page 5-3 - Paragraph 2 - Item 4: Applicant does not anticipate that reservoir levels will fluctuate to such an extent that sedimentation and erosion impacts will affect shoreline recreational use of the reservoir.	Your opinion has been noted.
39. Page 5-6 - Paragraph 1 - Item 3: As in No 38 above, Applicant does not anticipate reservoir levels will fluctuate to such an extent as to adversely affect the establishment of riparian or other vegetation planted along the reservoir margin.	Your opinion has been noted.
40. Page 5-7 - Item 5: Applicant does not believe that a pilot vegetation program would benefit the long-term mitigation effort. Because groundwater conditions will be different after construction of the project than prior to construction, a pilot program is not anticipated to provide information relative to the success of the long-term mitigation effort.	A pilot vegetation program would be very helpful in determining the conditions necessary for propagating native plants such as hackberry.
41. Page 5-7 - Item 8: Applicant does not expect that current design of project features will lead to reservoir fluctuations of a sufficient magnitude to adversely impact mitigation efforts.	Your opinion has been noted. See revised Section 4.1.4.1 and 4.1.6.1.

42. **Page 5-8 - Paragraph 2:** Staff states that the "Applicant's goal should be to replace habitat value losses with similar habitat of similar value". If quality habitat is established through the mitigation effort, habitat values will naturally follow. The goal of habitat mitigation should be the actual development of quality habitat, with habitat value inherent in the design of that development.	Staff believes that if there is going to be an effective monitoring program, it is important to quantify the existing quality of riparian habitat.
43. **Page 5-9 - Item 2:** See Specific Comment No 4 and Applicant's letter in Appendix C.	Because of the uncertainty concerning the type of fishery that would be best suited to the conditions in the proposed Wiley impoundment, Staff believes that the proper way to determine mitigation is to stock the species recommended by state and Federal resource agencies. Subsequent monitoring of the population would show which species is best suited to the new reservoir conditions. (See revised 4.1.4.1 and 5.2.1.4.)
44. **Page 5-9 - Item 3:** Applicant has been actively investigating types of fish habitat improvement structures which could be utilized in the Wiley Reach.	No response required.
45. **Page 5-9 - Item 4 and Page 5-10 - Paragraph 1:** The Shoshone sculpin has consistently been raised as a standard against development in this area. Applicant does not deny the intrinsic value of this unique fish to the region and State and is actively seeking ways to lessen impacts on this species (see General Comment No 2). However, within 10 miles of the A J Wiley Reach, the U S Army Corps of Engineers, the Idaho Department of Fish and Game and the U S Fish and Wildlife Service, are developing an expansion of the Hagerman National Fish Hatchery as part of the Corps of Engineers Lower Snake River Compensation Plan. Construction is on Riley Creek, Section 6, Township 8 South, Range 14 East, Gooding County, Idaho. Work conducted by Griffith, Daley, Beckham, Wallace, and Connolly indicates that several populations of Shoshone sculpin exist in Riley Creek and Bickel Springs adjacent to or directly in the Hagerman National Fish Hatchery. The Corps of Engineers Public Notice N(NPWEN-PL 82-1) dated February 4, 1982, describing said construction, awarded no special regard	Your opinion has been noted.

to the Shoshone sculpin. "Protection" of the Shoshone sculpin and its habitat should not be shouldered by private development alone.	Staff agrees.
46. Page 5-10 - Paragraph 1: See Specific Comment No 4 and General Comment No 2.	See revised Summary.
47. Page 5-11 - Paragraphs 1 and 2: The Applicant disagrees with the Staff statement that the recreation proposal of Applicant "to provide reservoir oriented recreational opportunities should be considered as development of opportunities that would be afforded by the project, and not as mitigation for the loss of river oriented recreational uses". Recreationalists who presently use the Wiley stretch of the Snake River for recreational purposes, may well continue to use Wiley reservoir. Recreational opportunities provided by the reservoir should be considered as mitigation for loss or, at the least, as replacement, of river oriented recreational activities.	Your opinion has been noted.
48. Page 5-11 - Paragraph 3: See General Comment No 2.	

Respectfully submitted,

Nicolas R Ysursa
Attorney

NRY:ke
Enclosures

cc: Lee Sherline

SUPPLEMENT A

2.1.9.2 Cost Consideration - Foundation Grouting

FERC Staff has increased the total foundation treatment cost included in the Project Cost Estimate from $4,295,000 to $13,395,000 while the total foundation treatment cost included in the Alternate Bridge Site Estimate was not increased.	The Bliss Bridge site, based on preliminary explorations, does not appear to have the deep, buried channel of the Ancestral Snake River that is present in the right abutment of the proposed Wiley site.
These increases were based on Staff's own estimate for a grout curtain in the right abutment. The Staff Estimate for this grout curtain amounted to $11,000,000 and was based on a 2,000 foot long curtain with 1,300, 3-inch diameter holes in three lines and spaced at 5 foot intervals for a total of 255,600 l.f. of grout holes.	No response required.
It is believed the Staff estimate for this grouting is extremely conservative and places an undo economic penalty on the application site, given the geologic information available at this time.	Staff does not believe that the grouting estimate is extremely conservative; because of the minimal amount of information available, a conservative approach must be taken.
As indicated in Exhibit 1 (IECO letter of April 1, 1982) which is attached, the engineer has reconsidered the costs used in the estimates for this work and has found them to be lower than they would now recommend.	Staff's total footage for curtain grounting across the old channel is based on the elevation of the ground surface taken from a USGS Quad Sheet and on the estimated shape and depth of the old channel.
When the adjusted costs are incorporated into the estimate, the total estimate item for foundation treatment increases from $4,295,000 to $4,984,000 for the Application Site and from $2,418,200 to $2,745,200 for the Bridge Site.	

EXHIBIT 1

[illegible]
ENGINEERS
INTERNATIONAL ENGINEERING COMPANY, INC.
[illegible]

[illegible]
SAN FRANCISCO [illegible]
[illegible]
PHONE [illegible]

8074-202
1 April 1982

Idaho Power Company
P.O. Box 70
Boise, Idaho 83721

Attention: Mr. D. E. Sprenger

Subject: A. J. Wiley Project - Estimated Cost of Grouting and Foundation Treatment

Gentlemen:

The following comments and cost estimates are in response to your request of March 26 that we review recent assumptions and cost estimates by FERC.

We would like to preface our comments by saying that the groutability of any given formation can be accurately estimated only by performing a grouting test in the field. As this is normally a final design activity, our FERC License Application estimate was based upon water test data and previous experience with somewhat similar materials.

For curtain grouting across the old channel at the application site we assumed three lines of holes at 10 ft. spacing. FERC assumed 5 ft. spacing which, in our opinion, is much closer together than necessary, particularly if the formation is as highly permeable as they assumed.

Our total estimated footage was slightly over 80,000 LF as opposed to 255,600 LF estimated by FERC for 1,300 holes. We believe both the number and depth of holes estimated by FERC is excessive. Our cross sections show that the holes will vary in depth from 200 ft. to 80 ft. The average depth of holes proposed by FERC is 197 ft.

We also believe that 3-inch diameter holes are unnecessarily large and expensive. We propose to use 2-inch diameter percussion drill holes.

The overall average cost of the program estimated by FERC is approximately $43 per LF. Recent costs for various comparable projects for which we have records are:

McPhee Dam, Colorado -- $27/LF
Ridgeway Dam, Colorado -- $33/LF
Canyonville Dam, Oregon -- $31/LF

We are willing to concede that our unit cost of $24 per LF could be considered an optimistic figure. If we increase our overall unit cost to

INTERNATIONAL ENGINEERING COMPANY, INC.

SUPPLEMENT A
EXHIBIT 1

$30 per LF, which we believe is a reasonable value, the estimated costs for foundation treatment for both the Application Site and the Bliss Bridge Site are as follows:

ESTIMATED COST OF FOUNDATION TREATMENT

Site	Oct. 1981 Est.	Revised Est.
Application Site		
Bed 2 Treatment	$1,200,000	$1,200,000
Dam Foundation Grouting	720,000	909,000
Drain Holes and Relief Wells	475,000	475,000
Grouting Old Channel	1,900,000	2,400,000
TOTAL	$4,295,000	$4,984,000
Bliss Bridge Site		
Dam Foundation Grouting	$1,241,000	$1,568,000

Please advise if you need additional information or discussion.

Yours truly,

Donald E Westcott

for Carter B. King
Project Manager

CBK:CWW:mvl

SUPPLEMENT B

2.1.9.2 Cost Consideration - Earth Embankment

FERC Staff has increased the total embankment cost included in the Project estimate from $2,462,600 to $14,680,000 and the total embankment cost included in the alternate bridge site estimate from $1,660,600 to $13,410,000.

These increases were based on overall unit prices to excavate, load, haul, place and compact of $16.21 per c.y. and $21.70 per c.y. respectively.

Applicant does not concur with this addition to the estimate and has conducted a review of the unit prices used in the estimate.

The objection to the increase in unit costs is based upon: 1) The attached Exhibit 1 (IECO, Inter-Office Correspondence, dated March 24, 1982, from I Mousley to C King, RE: Construction Cost Estimate); and 2) The attached Table 1 (Extraction from the Technical Record of Design and Construction, American Falls Replacement Dam by Bechtel Inc. August, 1979).

As seen in Exhibit 1, International Engineering Company, Inc., has recapped their development of the unit costs based on actual bid prices and remains firm in the opinion that the "Unit Prices included in the original estimate are reasonable."

Table 1 shows the final quantities and prices (1978) for embankment on the American Falls Dam Replacement construction. Based on the total overall quantity of 1,043,062 c.y. and the total cost of $4,603,536.90, the overall cost of the embankment (excavated, loaded, hauled, placed and compacted) was $4.41 per c.y. This cost escalated at 10% for two years (to 1980) is $5.34. The unit costs proposed by FERC Staff are 3 to 4 times higher than these actual costs and therefore, appear to be excessive.

Since the embankment materials used in the American Falls embankments were borrowed from rock quarries or other borrow sources several miles from the dam site, they should be expected to have much higher unit prices than materials placed in embankments from excavations and borrow areas within a few thousand feet of the dam such as the A J Wiley site.

When all of the foregoing is considered, it is felt that the unit prices used in the estimate are more accurate than the $16 to $20 per cubic yard costs suggested by FERC staff.

See revised Section 1.3.5.

INTERNATIONAL ENGINEERING COMPANY, INC.
INTER-OFFICE CORRESPONDENCE

FILE NUMBER 8074-210

DATE 24 March 1982

TO Carter King

LOCATION San Francisco

FROM Ian Mousley

LOCATION San Francisco

SUBJECT Wiley Dam Project
Construction Cost Estimate

As requested, I have reviewed the cost estimate for embankment earthwork included in the Wiley Project FERC licence application. A summary of my review and conclusions follows.

Comparable Projects

Attachment A lists bid prices for a number of earthfill dams bid during the period 1979 through 1981. This list is used as the source of the comparable bid prices stated in the following text. When comparing unit prices shown in Attachment A with those included in the Wiley Project Cost Estimate, the following distinctions should be kept in mind:

- Unit prices shown in Attachment A are average bid prices calculated by discarding the low and high bid and averaging the remaining bids.
- The unit prices shown in the Wiley Project estimate are based on costs in effect in January 1980 and do not include escalation. Bid prices shown in Attachment A include escalation in the costs of labor, material and services to end of construction.

Excavation Quantities

The total volume of excavation on the Wiley Project is about 2,848,000 cubic yards made up as follows:

Item	Volume (c.yd.)
Power Plant	280,000
Excavation for Dam & Spillway	1,649,000
Roads	150,000
Borrow for Embankment	
Core	110,000
Filter	74,000
Pervious Fill	300,000
Concrete Aggregates	285,000
TOTAL	2,848,000

The project is a moderately large earthmoving operation and the cost of mobilizing equipment and associated fueling, maintenance and repair facilities is distributed over a substantial volume of work.

Estimating Method

In February 1979, embankment unit prices were derived for the project by first reviewing the requirements for excavation and disposition of each class of material after which appropriate equipment was selected, load, haul and place cycles were developed and the cost of each operation calculated. Contractor's overhead and profit amounting to 40% of the direct cost was added to arrive at the estimated unit prices. In January 1980, unit prices were escalated by an average of 12% from the February 1979 amounts to develop the estimate which was included in the FERC licence application.

M-K Check Estimate

In June 1978, M-K Boise prepared a check estimate for the project which showed a total embankment cost of $6,675,900. Our January 1980 total estimated embankment cost of $7,958,200 for the same volumes is about 19% higher than the M-K check estimate.

Foundation and Spillway Excavation

The total amount of dam foundation and spillway excavation in the Wiley Project is 1,649,000 cubic yards priced at an average of $3.33 per cubic yard.

Comparable average bid prices from other dams are:

Dam	Unit	Quantity	Unit Price
Ridgeway Dam	CY	856,000	2.94
Spinney Mountain Dam	CY	250,000	1.55
" " "	CY	480,000	1.66
Adobe Dam	CY	512,000	1.00
Calamus Dam	CY	1,200,000	0.97

Impervious Core

The Wiley cost estimate includes 110,000 cubic yards of Impervious Core priced at $3.50 per cubic yard. According to the geological investigation, an adequate source of impervious core material is available about 3,000 feet from the dam.

Comparable average bid prices from other earthfill dams are as follows:

Dam	Unit	Quantity	Unit Price
Tiber Dam - Earthfill Zone 1	CY	173,000	3.93
Adobe Dam - Core	CY	674,000	1.60

Filter Drain

Filter drain material will be processed from borrow material which is available in adequate quantity within a half mile of the dam. Although only 74,000 cubic yards of filter material is required, there is an additional 285,000 cubic yards of concrete aggregate to be processed from the same material, hence processing plant mobilization costs are distributed over 359,000 cubic yards of product. The cost of Filter Drain material has been estimated at $8.40 per cubic yard.

Comparable average bid prices from other earthfill dams are as follows:

Dam	Unit	Quantity	Unit Price
Ridgeway Dam - Zone 5	CY	45,000	12.15
Spinney Mountain - Zone 5	CY	91,000	10.51
Tiber Dam - Zone 3	CY	122,500	5.08
Adobe Dam - Gravel Drain	CY	142,000	8.09

Other Embankment Materials

In the Wiley Project, there is an estimated 728,000 cubic yards of "Other Embankment Material" which is comprised of the following:

Pervious Borrow	300,000
Random Fill	378,000
Riprap	50,000

The pervious borrow is available within a half mile of the dam and according to the geological report will not require processing. The cost of excavation, hauling, placing and compacting this material has been estimated at $3.25 per cubic yard.

Random fill is available from the various excavations and is, therefore, delivered free to the embankment. Placing and compacting of this material has been estimated at $0.75 per cubic yard.

Riprap is available from the foundation excavation and will require scalping and placing only. The cost of this work is estimated at $4.00 per cubic yard.

The total cost of "Other Embankment Material" is therefore:

Item	Unit	Quantity	Unit Price	Amount
Pervious Borrow	CY	300,000	3.25	975,000
Random Fill (Place & Compact)	CY	378,000	0.75	283,500
Riprap	CY	50,000	4.00	200,000
		728,000		1,458,500

728,000 = $2.003/cubic yard
Use = $2.00 per cubic yard

Comparable average bid prices from other earthfill dams are as follows:

Dam	Unit	Quantity	Unit Price
PERVIOUS BORROW			
Ridgeway Dam - Zone 1	CY	575,000	3.79
Spinney Mountain Dam - Zone 1	CY	301,000	2.34
" " " - Zone 3	CY	685,000	2.15
Tiber Dam - Zone 2	CY	214,800	3.65
RANDOM FILL - PLACE & COMPACT			
Ridgeway Dam - Zone 1	CY	575,000	1.51
" " - Zone 3	CY	123,000	1.41
Spinney Mountain Dam - Zone 2	CY	231,000	0.89
" " " - Zone 4	CY	620,000	0.99

Conclusion

Based on this review, I believe the unit prices included in the original estimate are reasonable for the work involved.

Ian Mousley

IMM:art

Attachment: a/s

EARTHFILL DAMS

UNIT PRICES - EMBANKMENT

Item	Unit	Quantity	Unit Price	
RIDGEWAY DAM - COLORADO - BID 19 OCTOBER 1979				
Foundation Excavation	CY	856,000	2.94	
Borrow, Process & Haul Fill	CY	950,000	2.28	
Place and Compact, Zone 1	CY	575,000	1.51	3.79*
Place and Compact, Zone 1A	CY	28,000	2.95	5.13*
Place and Compact, Zone 3	CY	123,000	1.41	3.69*
Produce, Place and Compact Sand Filter, Zone 5	CY	45,000	12.15*	
SPINNEY MOUNTAIN DAM - COLORADO - BID 15 JULY 1980				
Excavate Unsuitable Materials	CY	250,000	1.55	
Excavate Spillway	CY	480,000	1.66	
Excavation	CY	890,000	1.52	
Excavate Place and Compact, Zone 1	CY	301,000	2.34	2.34**
Compact, Zone 2	CY	231,000	0.89	2.41**
Excavate Place and Compact, Zone 3	CY	685,000	2.15	2.15**
Compact, Zone 4	CY	620,000	0.99	2.51**
Produce, Place and Compact, Zone 5	CY	91,000	10.50	10.51*
TIBER DAM - MONTANA - BID 29 JULY 1980				
Earthfill, Zone 1	CY	173,000	3.93**	
Earthfill, Zone 2	CY	214,800	3.65**	
Sand and Gravel, Zone 3	CY	122,500	5.08*	
ADOBE DAM - ARIZONA - BID 2 OCTOBER 1980				
Foundation Excavation	CY	512,000	1.00	
Core	CY	674,000	1.60**	
Embankment (Random)	CY	1,480,000	1.17**	
Gravel Drain	CY	142,000	0.09*	
CALAMUS DAM - NEVADA - BID 11 JANUARY 1980				
Foundation Excavation	CY	1,200,000	0.97	

* Total Borrow Process Haul Place and Compact
** Total Borrow Haul Place and Compact

EARTHFILL DAMS

UNIT PRICES - EMBANKMENT

Item	Unit	Quantity	Unit Price	
RIDGEWAY DAM - COLORADO - BID 19 OCTOBER 1979				
Foundation Excavation	CY	856,000	2.94	
Borrow, Process & Haul Fill	CY	950,000	2.28	
Place and Compact, Zone 1	CY	575,000	1.51	3.79*
Place and Compact, Zone 1A	CY	28,000	2.95	5.13*
Place and Compact, Zone 3	CY	123,000	1.41	3.69*
Produce, Place and Compact Sand Filter, Zone 5	CY	45,000	12.15*	
SPINNEY MOUNTAIN DAM - COLORADO - BID 15 JULY 1980				
Excavate Unsuitable Materials	CY	250,000	1.55	
Excavate Spillway	CY	480,000	1.66	
Excavation	CY	890,000	1.52	
Excavate Place and Compact, Zone 1	CY	301,000	2.34	2.34**
Compact, Zone 2	CY	231,000	0.89	2.41**
Excavate Place and Compact, Zone 3	CY	685,000	2.15	2.15**
Compact, Zone 4	CY	620,000	0.99	2.51**
Produce, Place and Compact, Zone 5	CY	91,000	10.50	10.51*
TIBER DAM - MONTANA - BID 29 JULY 1980				
Earthfill, Zone 1	CY	173,000	3.93**	
Earthfill, Zone 2	CY	214,800	3.65**	
Sand and Gravel, Zone 3	CY	122,500	5.08*	
ADOBE DAM - ARIZONA - BID 2 OCTOBER 1980				
Foundation Excavation	CY	512,000	1.00	
Core	CY	674,000	1.60**	
Embankment (Random)	CY	1,480,000	1.17**	
Gravel Drain	CY	142,000	0.09*	
CALAMUS DAM - NEVADA - BID 11 JANUARY 1980				
Foundation Excavation	CY	1,200,000	0.97	

* Total Borrow Process Haul Place and Compact

** Total Borrow Haul Place and Compact

SUPPLEMENT B

TABLE I
AMERICAN FALLS DAM RECONSTRUCTION*
FINAL QUANTITIES AND COSTS

BID ITEM	DESCRIPTION	UNIT	PRICE	BID QUANTITY	BID AMOUNT	FINAL (1978) QUANTITY	FINAL (1978) AMOUNT
	EMBANKMENT						
7-1	Zones 1 & 1A-Left Abutment (Core)	c.y.	2.50	133,000	332,500.00	146,302	365,755.00
7-2	Zones 1 & 1A-Right Abutment (Core)	c.y.	1.50	72,000	108,000.00	93,522	140,283.00
7-3	Zone 2 (Filter)	c.y.	11.00	74,000	814,000.00	78,750	866,250.00
7-4	Zone 3 Upstream (Rock Fill)	c.y.	4.00	360,000	1,440,000.00	385,878	1,543,512.00
7-5	Zone 3 Downstream (Rock Fill)	c.y.	5.50	350,000	1,925,000.00	303,437	1,668,903.50
7-6	Zone 5 (Random Fill)	c.y.	0.30	52,000	15,600.00	35,153	10,545.90
7-7	Slope Protection	c.y.	9.00	750	6,750.00	920	8,280.00
7-8	Additional Compaction	hr.	40.00	500	20,000.00		-
	Subtotal Section 7 Items				$4,661,850.00		$4,603,534.93

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* Reproduced from Technical Record of Design and Construction, American Falls Replacement Dam, 1979 Bechtel, Inc.

SUPPLEMENT C

Since it is felt that the costs which FERC Staff added to the application site and Bliss Bridge site estimates were far too conservative, recalculated values shown in Table 1-12 based on the application estimates which have been adjusted to reflect higher grouting costs as proposed under Section 2.1.9.2 in Comment No 11.

Economic comparison of the proposed A J Wiley Project with the most feasible and economical alternatives. 1/

	Proposed A J Wiley Project	A J Wiley Bliss Bridge Site plus supplemental capacity and energy	Capacity and energy from a 250-MW steam plant at Bliss
Installed capacity (MW) 2/	86	86	84.4
Dependable capacity (MW)	70.5	70.5	70.5
Total capital cost for mid-point of construction including interest ($Million)	197.7	194.3	174.7
Annual energy generation 50-year average (GWh)	485.4	485.4	485.4
1986 Total annual cost 3/ ($Million)	36.2	35.9	42.53
Cost in mills/kWh	74.6	74.0	87.63
50-Year present worth levelized 4/ Annual cost ($Million)	36.9	36.8	52.24
Costs in mills/kWh	76.0	75.7	107.63
1986 Power benefit-cost ratio 5/	1.17	1.18	NA
50-Year present worth levelized power 6/ benefit-cost ratio	1.42	1.42	NA
Average annual coal consumption	0	5,900 tons	272,400 tons

1/ Idaho Power Company.

2/ 1 megawatt equals 1,000 kilowatts.

3/ 1986 annual costs include fixed costs, operation, maintenance, administration, and general expenses.

4/ 50-year present worth levelized annual costs are based upon 10 years of escalation of 10 percent annually for fuel, 7 percent O&M expenses, and 12.95 percent costs of money.

5/ 1986 benefit-cost ratio is the 1986 cost of the coal-fueled alternative energy divided by the 1986 cost of the hydro plant energy.

6/ The 50-year power benefit-cost ratio is the 50-year present worth levelized costs of the coal-fueled alternative energy divided by the 50-year present worth levelized costs of the proposed project energy.

See revised Sections 2.1.9.2 and 1.3.5.

DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208

NPDPL-ER

14 April 1982

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FEDERAL ENERGY REGULATORY COMMISSION

Mr. Thomas N. Russo
Federal Energy Regulatory Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Dear Mr. Russo:

This is in reference to the draft environmental statement concerning the A. J. Wiley Hydroelectric Project, FERC No. 2845 Idaho, proposed by the Idaho Power Company of Boise, Idaho.

The draft statement has been reviewed relative to our functional area of responsibility and expertise for hydropower and navigation and we have no comment. We are concerned, though, with the failure of the statement to adequately address those environmental matters that we must consider in our regulatory responsibilities of Section 404 of the Clean Water Act. The applicant, Idaho Power Company, prior to initiation of construction of the proposed hydropower facility, must obtain the necessary Section 404 documentation from the Corps of Engineers and as part of that action must provide sufficient data to complete a Section 404(b)(1) evaluation as outlined in 40 CFR 230 (December 1980). If the subject statement fulfills the requirements of the referenced codified regulation, this would allow the Corps of Engineers to adopt the FERC Statement as part of the Section 404 requirements and would assist in processing the applicant's Sec. 404 permit in a timely manner.

Sincerely,

ROBERT L. CROSBY
Colonel, Corps of Engineers
Acting Commander

8204210443

FEDERAL ENERGY REGULATORY COMMISSION
DOCKETED
APR 19 1982
DOCKET SECTION

See our letter dated December 10, 1981, to L.V. Armacost, P.E., Walla Walla District.

United States Department of Agriculture
Forest Service
Washington Office
12th & Independence SW
P.O. Box 2417
Washington, DC 20013

Reply to: 2770

Date: APR 19 1982

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TO	RET.	DATE

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FILED
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APR 22 1 55 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

Mr. Robert E. Cackowski
Acting Director
Office of Electric Power Regulation
Federal Energy Regulatory Commission
825 North Capitol Street NE
Washington, DC 20426

Dear Mr. Cackowski:

This supplements our January 19 letter and addresses issues covered in your February 1981 Environmental Impact Statement which called for comments by April 19, 1982, concerning Idaho Power Company's, A. J. Wiley Hydro Project No. 2845 on the Snake River in Gooding and Twin Falls Counties, Idaho.

Idaho Power Company proposes to construct a hydroelectric project consisting of Wiley Dam that would create a 625-surface acre reservoir with 24,000 acre-feet storage together with pertinent facilities. Of the 800 acres in the project, 100 acres are agricultural. About 77 acres of productive agricultural land would be impacted (page 4-26 of the EIS). Grazing for 50 animal units would be lost. Forty-six acres of agricultural land used for borrow sites are to be reclaimed. The net loss of 50 acres of cropland and range for 50 animal units is acceptable.

Sincerely,

M. R. Howlett

for GARY E. CARGILL
Associate Deputy Chief

8204230358

No response required.

FS-6200-11b (7/81)

439 Styner Avenue
Moscow, Idaho 83843
April 16, 19[illegible]

FILED
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APR 22 10 23 AM '82
FEDERAL ENERGY REGULATORY COMMISSION

Mr. Thomas N. Russo
Federal Regulatory Commission
825 North Capitol Street, NE.
Washington, D. C. 20426

Dear Sir:

This letter concerns the A. J. Wiley Hydroelectric Project, FERC No. 2845-Idaho.

I strongly oppose the FERC issuing a license for construction of a hydroelectric project on the Wiley Reach of the Snake River. My major reason is that already the Snake River from Milner Dam to Bliss Dam has been appropriated largely for hydroelectric, fish-hatchery, and irrigation purposes. It seems only reasonable that a short segment of free-flowing river should be reserved for recreation, scientific use, and protection of rare species.	Your opinion has been noted.
The DEIS FERC No. 2845-Idaho summarizes the significant environmental impacts very well on pages 5-1 and 5-2. I see little need to repeat those concerns here.	Your opinion has been noted.
I came to Idaho as a child with my parents in 1911 and settled in the Twin Falls country. Snake River from Milner Dam to much below Bliss Dam was undeveloped. Over the years I watched the river harnessed and developed, until now very little free-flowing river remains undeveloped. This development probably is as it should be, except that the zeal to develop far overrides the need to protect a few areas for recreation, reflection, scientific purposes, and as examples of what once existed. Is it too much to ask that an 8-mile stretch of free-flowing river be reserved for these purposes?	No response required.
If the proposed development would solve the energy needs of southern Idaho in a major way, then the sacrifice of environmental values might be justified. But sacrifice of environmental values of this 8-miles of free-flowing river for a hydroelectric development that would defer the need for other energy developments by only one year is not in good conscience justified!	Your opinion has been noted.

Sincerely

Charles A. Wellner
Charles A. Wellner

BCA

United States
Department of
Agriculture

Soil
Conservation
Service

Room 345
304 North 8th Street
Boise, Idaho 83702

P-2845

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FEDERAL ENERGY
REGULATORY
COMMISSION

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DIVISION OF HYDROPOWER
LICENSING

Secretary, Federal Energy
    Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

TO WHOM IT MAY CONCERN:

The Soil Conservation Service in Idaho has reviewed the Draft Environmental Impact Statement for the A. J. Wiley Hydroelectric Project and offer the following comments:

1) We feel that the environmental impacts are significant. Environmental impacts of the project summarized on pages 5-1 through 5-3 indicate that benefits may not outweigh the losses to the people of Idaho and the environment. Losses such as:	No response required.
a) Inundation of the last significant whitewater reach of the Snake River in Southern Idaho.	No response required.
b) The loss of the existing rainbow trout and white sturgeon riverine habitat.	No response required.
c) Loss of a unique riparian community rated as the sixth most important habitat site in Idaho.	No response required.
2) Construction of this project will result in the following very significant environmental impacts:	
a) Riparian vegetation would not re-establish with the previous diversity of species and growth pattern along the river and associated wildlife populations would decline.	Although Staff agrees, it is recommending a revised mitigative plan to reestablish the diversity of plant species as closely as possible.
b) The fluctuations in reservoir levels over short periods of time would result in erosion and sedimentation impacts on the shoreline. Reservoir induced land sliding and subsequent intense erosion would develop at potentially unstable clay and silt deposits along the shoreline.	No response required.
c) Reduction in water velocity, would result in increased aquatic plant production in the reservoir.	No response required.
d) Greater retention of heat, sediment, and nutrient substances in the reservoir would result in a decline in overall water quality.	No response required.

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We feel that these environmental impacts should be given very serious consideration when weighing the merits of the project.

Thank you for the opportunity to review and comment.

Sincerely,

Amos I. Garrison, Jr.
State Conservationist

Your opinion has been noted.

Tomales Bay Marine Laboratory
22555 Shoreline Highway, Marshall, California 94940 415/663-8070

April 23, 1982

Mr. Thomas N. Russo
Federal Energy Regulatory Commission
825 N. Capitol Street N.E.
Washington, D.C. 20426

Dear Mr. Russo:

Many thanks for sending me a copy of FERC No. 2845 Idaho Draft Environmental Statement on the proposed A.J. Wiley Hydroelectric Project. I have years of experience in the area, and effectively have all the information on some of the candidate endangered or threatened species. I hope that my comments will carry weight.

The Wiley reach of the Snake River includes critical habitat of three candidate endangered or threatened species of freshwater snails. These are as follows:

See revised Section 3.1.5. According to the U.S. Fish and Wildlife Service, the Giant Columbia River limpet is not a candidate endangered or threatened species.

1. Bliss Rapids snail (not yet formally named), family Hydrobiidae.
2. Snake River Physa snail (not yet formally named), family Physidae.
3. Giant Columbia River limpet (Fisherola nuttalli), family Lancidae.

The following summaries of distribution and habitat are based on personal collecting and field observations at intervals since 1955, especially in 1980-1981 with support from U.S. Fish and Wildlife Service (order 14100-0141-81).

See revised Section 3.1.5.

The Bliss Rapids snail is known from Box Canyon, T. 8 S., R. 14 E., Gooding County, as well as in the main stem of the Snake River in riffles and rapids from below Lower Salmon Falls dam to the mouth of Clover Creek above King Hill. It is not only a distinct species, but a distinct genus, unique to this part of Idaho. Prior to the development of fish farms and impoundments of the river and of its large-spring tributaries, the Bliss Rapids snail was presumably found in the Snake River up to Box Canyon at least, and perhaps even to Shoshone Falls. No trace of it has been found below the white-water segment of the Snake River characterized by lava canyons and boulder bars.

The Snake River Physa snail has been found only in the main stem of the Snake River from below Lower Salmon Falls dam to Bancroft Springs in sec. 4, T. 6 S., R. 11 E. Sampling this species (so far found only on boulders in fast-flowing rapids) is exceptionally difficult. Hence it is possible the

See revised Section 3.1.5.

snail occurs downstream as does the Bliss Rapids snail. A former range upstream into the vicinity of Thousand Springs, or even to Shoshone Falls, is plausible but speculative.

The Giant Columbia River limpet has been found in the Snake River in Idaho in only two areas: in the white-water segment of the Snake River from below Lower Salmon Falls dam to Bancroft Springs; and near Rupert, Minidoka County. The latter occurrence dates to 1913 and has not been confirmed in recent years. Like the Bliss Rapids snail and Snake River Physa snail, the Giant Columbia River limpet has been found characteristically on boulders in rapids. Locally all three species can be found together. The occurrences in southwestern Idaho are hundreds of miles from the other surviving colonies in the Columbia River drainage.

See revised Section 3.1.3.3.

The proposed Wiley Project would eliminate much or most of the critical habitat of the Bliss Rapids snail and the Snake River Physa snail; and much or most of the critical habitat of the Giant Columbia River limpet in the Snake River. The project should not be authorized unless and until substantial efforts at preservation of these species have been carried out. Establishment of new colonies in areas secure from pollution, impoundment, or other significant disturbance would be the measures of choice. Past and present restrictions on the ranges of the species, reflecting different habitat requirements, suggest different measures would be appropriate for each one of the three species.

See revised Sections 4.1.5 and 4.1.7.

Your opinion has been noted.

Bliss Rapids snail. Historically (in a geologic sense) restricted to the area of its modern range and immediate vicinity. This is the only one of the three species that has been found outside of the main stem of the Snake River in southern Idaho. If the entire stretch of Box Canyon could be preserved the species would be adequately protected. As natural populations of the species have not been found in other spring-fed tributaries of the Snake River locally, nor in such local tributaries as Salmon Falls Creek, all these streams are probably too small to support the species. Possible upstream sites in the Snake River basin that might be suitable would be in Henrys Fork or other major tributaries. The narrow range (modern and geological) is most likely due to stream barriers such as major falls, and hence establishment of new colonies upstream may be feasible.

See revised Section 5.2.1.4.

Snake River Physa snail. Historically (in a geologic sense) found in Bear Lake and in the Snake River near American Falls Reservoir in southern Idaho. Modern and fossil occurrences both indicate this is a large-water (major streams, large lakes) species. There is possibly no suitable habitat outside the present range in the Snake River drainage for establishment of other colonies. The Salmon River in central Idaho, or possibly the Pend Oreille River below Pend Oreille Lake, or Spokane River below Coeur d'Alene Lake, would be possible sites for transplantation. Living snails are exceptionally difficult to obtain, hence the establishment of a local colony for propagation in an aquarium would probably be necessary.

Mr. Thomas N. Russo
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Giant Columbia River limpet. The present status and distribution of the species in Idaho remains uncertain in the absence of field studies. Possibly colonies occur in the Clearwater or Salmon Rivers already in secure situations, and no transplantations would be called for. The search for the species in the Salmon River or other rivers in Idaho should be carried out as part of the search for potential transplant sites for the Snake River Physa snail.	
Specific recommendations. Bliss Rapids snail. Permanent conservation of the habitat in Box Springs Canyon would be the simplest procedure biologically. If this is not possible then suitable sites for the planting of new colonies should be sought. These might be in streams fed by large springs upstream in the Snake River drainage. The successful transplant and establishment of new colonies should be determined by periodic monitoring before the elimination of critical habitat in the Snake River is permitted.	See revised Section 5.2.1.4.
Snake River Physa snail. A first step should be the establishment of a breeding colony from which transplants can be made. FERC Staff can prepare detailed guidelines, hence I suggest only a general course of action. A relatively simple and low-cost provision for replication of habitat and easy obervation should be tried. As the species has not been found in the outflow of the large springs issuing from the lava coves along the Snake River, a temperature factor might be involved. Hence I propose a scheme such as the following: Divert water from a large spring source such as Box Canyon or Malad River into a partially shaded pond to ensure some seasonal temperature fluctuation, but no algal bloom (a trout hatchery-type pond is unlikely to be useful). Lead this water through aquaria in a suitable building where the survival and reproduction of the animals can be readily monitored. Return water to the source stream with scarcely any effects (increased seasonal temperature fluctuations). Suitable large-river habitats for planting of the aquarium-reared animals should be sought in conjuction with status survey of the next species.	See revised Section 5.2.1.4.
Giant Columbia River limpet. A survey of the present status, distribution, and abundance of the species in Idaho should be undertaken. This would conform to guidelines already established by the U.S. Fish and Wildlife Service, but be funded by Idaho Power Company. The species may occur in secure habitats outside the Snake River. If not, search for suitable sites for the planting of new colonies should be carried out.	Your opinion has been noted.
In summary, if Idaho Power Company is to be permitted to eliminate much or most of the habitat of these biologically unique and local species, the Company should be required seriously to undertake compensatory efforts. Already this same Company has eradicated other species in southwestern Idaho and it should no longer be permitted such heedless actions.	No responses required.

Very truly yours,

Dwight W. Taylor

Dwight W. Taylor

Dr. Peter Bowler

Comments on the Draft Environmental Impact Statement

for the A. J. Wiley Project

Summary	Application was filed on August 25, 1980, not 1981.	See revised Summary.
	Although the project is listed at 70.5 MW of dependable power, the facility, if located at the proposed site, would produce 37.5 MW ninety percent of the time (Application, August 1980, p. 6). At the Bliss Bridge Alternative site there would be less head, with a smaller capacity and 90% of the time production (discussed below). This should be reflected in the summary.	See revised Section 1.3.1.1 and Summary.
Para. 5	The Bliss Bridge Alternative Site would have between 4 feet and 7.2 feet less head than the Applicant's Proposed Site. Applicant would excavate to recover two feet of the lost fall. This should be noted in the Summary.	
	"Staff believes that other sites (than Bliss, Idaho) are available in and outside of Idaho that may be developed by Applicant and neighboring utilities." Where are these sites, which are the neighboring utilities, and why is joint ventureship not developed as a component of the coal-fired steam-electric plant alternative? What would the cost comparision be to construct a new thermal plant sited in the Service Area versus installing a comparable unit in an existing plant in Nevada? A one-tenth share of a plant such as Boardman might be a more accurate alternative in terms of similar capacity listings.	The ownership of the coal plant, being either sole or joint, would not in itself affect the siting or environmental effects of this alternative. Staff is not aware of any existing coal plants that could be expanded beyond their planned ultimate capacity. See revised summary. Your opinion has been noted.
Pg. 2; para. 1.	The costs of the two damsites cannot be reliably established until the geological problems have been adequately characterized, designs developed which would solve the problems described, and approval of design conferred. Cost effectiveness cannot be established until project costs have been clarified.	The costs of the two damsites are as well known as possible at this time (as well known as the alternatives). Staff has included the costs of special foundation treatment in its estimates that are in its opinion adequate to ensure construction of a safe and adequate project at either the proposed site or Bliss Bridge site. See revised Sections 1.3.5 and 2.1.9.2.
para. 4.	Summary should reflect that the proposed project would meet forecasted need for less than a year while the coal-fired steam-electric plant would meet several years of novel need with the option of adding a second unit to provide over a decade of new energy requirements.	See revised Summary.
Pg.1-1; para. 2	There are three installed independent small hydroelectric developments on tributaries along the Wiley Reach, and FERC Exemption requests have been filed for six small hydroelectric projects on the Reach.	See revised Section 1.1.1 and discussion of power development at springs in Section 1.3.2.3.
Para. 4	Wiley Reservoir would encroach upon three installed and three proposed small hydroelectric operations. Reduction in average operating head due to encroachment of Wiley Reservoir would decrease independent small hydro by approximately 185 KW, and proposed small hydro projects would forego production of additional independent small power production. All propose to resell power to the Applicant, Idaho Power Company. Several other sites with no present filings exist along the Wiley Reach in addition to those with existing or planned generation.	
Pg. 1-2	Table 1-1 should incorporate the independent power losses described above. The loss of an alcohol fuel plant should also be noted, and its production level cited.	The power losses described are too small (0.2 percent) to be within the accuracy of the studies; it has not been demonstrated that the proposed project would make the alcohol plant obsolete.

	There is an analytical error apparent throughout section 1 of the Draft E.I.S. in the treatment of the Bliss Bridge Alternative Site. The disparity in head between the Applicant's proposed site and the Bliss Bridge site is not factored in for the project benefits of the upriver damsite. While certain tables indicate supplemental coal use to even the disparity, actual damsite production is not listed. What would it be? Mr. Jack Duckworth of the FERC Staff (Transcript of Proceedings, Scoping Session of July 28, 1981) recognizes that the Bliss Bridge site would produce "six or seven percent less energy" than the proposed site. Applicant (Idaho Power Company, 1981, p. 2) states that the Alternative site is "about 4 feet higher than the river at the application site" and suggests that "it may be feasible to deepen the channel downstream from the existing Bliss Bridge which would result in lowering the river level at the alternate site" (Applicant hypothesized that two feet of fall could be recovered through this methodology). In generation estimates for the Bliss Bridge Alternative site, Applicant assumes that the two feet of head will be gotten (by excavating 100,000 cubic yards of material from the riverbed).	See revised Sections 1.3.1.1 and 1.3.5. See revised Section 1.3.1.1.
	The gradient throughout the Wiley Reach is relatively constant, with fall equalling approximately 9.5 feet per mile. If this gradient is consistent for the 4000 foot segment from the Alternative site to the Application, then the loss in head would be much higher, closer to 7.2 feet, rather than the 4 feet cited by the Applicant. This appears reasonable on the basis of Applicant data (see Figure C-5, Reservoir Backwater Plan and Profile, Idaho Power Company, 1978). Were this to be the case, power production would be reduced by 9.1% (compared with the 79 feet of head at the Application site), or 6.6% if the river were channelized to an additional depth of two feet.	See revised Section 1.3.1.1.
	Channelization of 4000 feet of Snake River would be costly, and could require construction of added coffer dams. Itemized cost for channelization of the Snake River is not apparent in Table 3 (Idaho Power Company, 1978). Since Applicant cost was considered unreasonably low (see DEIS), an itemized cost breakdown should be presented. Parenthetically, it should be noted that 10GG1 would be the access site for the heavy equipment to be used in the channelization, thus it should receive full mitigation prior to disturbance (and costs should be included in the Bliss Bridge Alternative Site calculations). Similarly, channelization would eliminate riparian vegetation below the alternative site, and this loss should be incorporated in alternative site mitigation plans.	See revised Section 1.3.1.1. No response required. See revised Section 1.3.1.1. No response required. See revised Section 1.3.1.1.
Para. 2	Irrigation water is diverted from the Snake River in Lower Salmon Falls Reservoir by high lift pumps for use on the Bell Rapids Project. The subsequent loss in volume should be reflected in downriver data from approximately 1970-1975. Accuracy would be enhanced if data through 1981 were presented.	Staff believes that the hydrologic studies conducted by Applicant incorporate the reduction in volume. Your opinion has been noted.
Pg. 1.2.3.	The section on Future Energy Resources and Table 1-4 should incorporate Idaho Power Co.'s estimate of an additional 80 MW of independent power it will purchase by 2000 . Eight contracts have been signed and at least one independent project is already on line with the Applicant. This estimate is likely very low. Projected conservation savings should be noted in this section.	See revised Sections 1.2.3 and 1.3.2.2. Your opinion has been noted.
Pg. 1-11; para. 2	What is the projected timeline for reaching the estimated conservation savings equivalent of 253,000 MWh under Applicant's conservation program?	See revised Section 1.2.4.1.

Pg. 1-11; para. 3	Recent IPUC rulings should be incorporated to update this discussion. Recent rate actions by IPUC should be reflected in 1.2.4.2.	See revised Section 1.2.4.1.
Pg. 1-13	Recent IPUC rate-making policy has produced substantial increases in all user categories. This should be discussed.	It is too early to tell what effect the increased rates will have on electricity usage, i.e., price elasticity. See revised Section 1.2.4.2.
Table 1-9	Table 1-9 should incorporate 80 MW of independently generated power Applicant projects being on line by 2000. In this table the North Fork Payette, Lucky Peak and Cascade Projects should all have their production listed. There are many other independent projects such as Clear Lakes, Auger Rapids, and the American Freedom Dam on the Snake River alone which propose to use the Applicant's grid (Kanaka Rapids is an Idaho Power Project, as is the proposed Dike Project). The large projects which have FERC Preliminary Permits should also appear here. It should be noted that using installed capacity values diminishes the utility of these estimates. It would be more useful to the layman to present the 90% of the time production values.	Only projects under permit for which application for license are in preparation are included. Ninety percent of the time, production values are not an accurate measure of Pacific Northwest hydro capability; dependable capacity is the more accurate measure.
Pg. 1-16; para. 1	As I stated earlier, Applicant projects 80 MW of independently produced power on line within the next decades. Conservation measures should also be at a maximum during this time.	See revised Section 1.2.5.
Pg. 1-16; para. 5	This assumes that new irrigation load will occur.	See revised Appendix A for assumptions used in load forecasts.
Table 1-18	In Table 1-18, what was the 1981 deficit without Wiley?	See revised Sections 1.2.4, 1.2.5, or Appendix A.
Pg. 1-19; para. 3	If Applicant's proposed coal plants 1 and 2 can be postponed until 1992, they would create an additional 250 MW deficit if they are postponed from 1989. This greatly reduces the credibility of Applicant's need projections. Analysis of adverse streamflow years should they occur during that time would make a major shortage.	No response required.
Pg. 1.3	This section of the application assumes that partial alternatives are not alternatives at all. Consequently, possible combinations of alternatives which would realize the proposed hydroelectric benefits of the project with significantly less environmental and recreational loss are not adequately addressed.	See revised Section 1.2.4.1.
	Environmental impacts of alternatives as opposed to this environmentally undesirable project are not discussed. The decrease in projected costs of alternatives is not presented.	Staff disagrees. The EIS adequately discusses the environmental impacts of feasible alternatives to the proposed project.
1.3.3.6. Purchased Power	This section does not discuss PURPA implementation in Idaho. The Idaho Power Company Service Area is rich in small power resources with estimates of small-hydro or indpendent potentials ranging above 200 MW. It is my understanding that Applicant has signed eight contracts with indpendent generators, has one plant on line from independent sources, and projects 80 MW of independently produced power on line in the next decades. Ignoring this resource is a major error in the logic of the Tables in Section I and reflects a lack of treatment of the full range of Alternatives, as mandated by NEPA. What is the potential of independent hydro in the service area, and what are the estimates for utilization in the next decade?	See revised Section 1.3.2.2. Staff can only assess potential development of projects under active consideration; anything more would be conjecture. See revised Sections 1.2.5 and 1.3.2.

1.3.4.2. Conservation	Conservation is an alternative to construction and is also a factor influencing demand for electric power. Conservation is not treated as an Alternative in this DEIS, despite statements like "It is estimated that more than 75 percent of the residential water heaters in the service area now are insulated and that the annual energy savings may approach 80 million kwh in future years" (page 1-11, paragraph 1). The DEIS states (page 1-11, paragraph 5) that effects of conservation on demand have been incorporated into load projections in 1.2.4. What will the contribution of conservation be year by year for the next decade under Applicant's programs? Was this incorporated into Tables 1-10 and 1-11? If 75 percent of the water heaters are wrapped, why isn't conservation recognized as a non-structural alternative to construction? Compliance may be voluntary, but surely precise records are maintained of exactly how many wraps have been carried out.	Load reduction through conservation (primarily based on assumed price increases) was considered in load projection estimates; therefore, conservation has been evaluated and determined to be needed as an adjunct to, but as not a valid alternative to, the proposed project. See revised Section 1.2.4, 1.2.5, and Appendix A.
	Applicant's proposed implementation of an energy saving fluorescent lamp rebate program for non-residential customers was recently approved by the PUC (Order No. 17222). The Applicant estimates that if 400,000 replacements are made, an energy savings of 50,400,000 kilowatt hours would be realized. This program commenced on April 15, 1982, on a first-come first served basis for the initial nine months or until the goal of 400,000 lamps are replaced. This program and the project savings should be cited in the Final EIS.	See revised Section 1.2.4.1.
Pg. 1-20	Malde (1981) should be cited in respect to the foundation conditions. If Applicant channelizes and deepens the 4000 foot segment of Snake River between the Bliss Bridge site and the proposed site to gain the two feet of head it estimates it could recover, riparian vegetation would likely not survive along the borders of the present river or the channelized, lowered bed. This acreage should be calculated and included in mitigation planning accordingly.	Malde (1981) is not an engineering document and does not provide hard engineering data concerning the project foundation conditions. See revised Section 1.3.1.1.
Table I-I, I-II	Why does a hydro based utility use median water year production in its planning and need projection modes? This is a profound criticism of Applicant's projections. Using average streamflow conditions masks the adverse or low-flow (1935 level, for example, as a worst case) impacts which would cause serious regional deficits in all hydro based utilities. During adverse flow conditions all hydro projects would suffer low production, while coal-fired facilities would not be impacted. Interruptible power would be shifted to priority end uses. By using average streamflow production as a basis, small projects like Wiley become more useful appearing, while their contribution would be the least during adverse need periods. This is not the case with thermal solutions.	Staff presented evaluation of need for power based on adverse flow conditions. (See revised Section 1.2.5.)
Pg. 1-23, 1.3.3.	The Draft EIS does not adequately treat the full range of alternatives as delineated by NEPA. For example, within the coal-fired alternative, there are several sub-options which are neglected. The addition of a new 250 MW unit at an existing thermal facility in the Idaho Power	Staff disagrees. Discussion of alternatives in the EIS emphasizes the most likely alternative within the State of Idaho. No such plants exist where such additions are not already assumed in the resource projections.
	[In Table I-9 it would be useful to the non-expert to have the dependable capacity for the Wiley Project listed (perhaps in parenthesis adjacent A.J. Wiley at the bottom of the table).]	See revised Section 1.2.5.

Service Area but outside of Idaho (one of the facilities owned in part by the Applicant) would meet the projected need at a site where transmission facilities and access to a railhead are established. This alternative would likely be less expensive than siting a new plant in Bliss or elsewhere. It is true that sooner or later Nevada will limit expansion of thermal plants within its boundaries, and the Applicant will eventually construct a future facility somewhere more centrally located in its service area.	No response required.
If Applicant were to fully finance Coal Plant #1 instead of joint ventureship, this facility would replace need for a number of projects, including Wiley, and it is listed as being on line as early as 1987 (Table I-10, for example).	Your opinion has been noted.
Bliss has some drawbacks as a coal-fired site. For example, transmission facilities could accomodate a 250 MW unit, but would require an expensive up-grading to carry a larger load. The Application has two thermal units slated for the late 1980's or early 1990's, and it is unrealistic to suggest that only one unit would be constructed at a new site.	Your opinion has been noted.
It was politically unfortunate to list Bliss as the hypothetical thermal plant site, since this was the scene of one of the most vigorous uprisings against a thermal plant in recent years. In a sense Bliss residents are asked whether they would like a broken arm or a broken leg in terms of resource losses. There are already three dams on the Snake River within eight miles of Bliss, so that this community and ecosystem has already contributed heavily to the manufacture of energy.	Your opinion has been noted.
As Mr. McMahon (PUC) mentioned in an interview with the Enterprise following the July 28, 1982 scoping session in Gooding, the construction of Wiley Dam would enhance the attractiveness of Bliss as a possible thermal plant site.	No response required.

In a straight forward manner, Section 1 of the DEIS presents one of the fundamental policy planning issues which the Applicant, its ratepayers, the stockholders, and the PUC must resolve in the near future. That issue is what is the best public interest strategy for the triangle of interests (ratepayers, Applicant, and its stockholders) to meet future need projections - the construction of a base-load coal plant soon, which would meet need for a number of years and offset deficit during adverse flow years when the hydro base is down in production, or whether immediate need should be stop-gapped by the piecemeal development a number of proposed hydroelectric sites; then constructing a coal-fired steam electric plant to cover the deficit which would emerge shortly after these project came on line (see Tables 1-10 and 1-11). Non-structural alternatives are not regarded as Alternatives in this section, in terms of being an alternative for this project. According to the DEIS, even if all hydroelectric potential were to be developed - regardless of cost effectiveness, environmental, recreational, or other problems - their production would be insufficient to meet novel need, thus Applicant foresees construction of two new coal units (joint ventures with a neighboring utility) to be on line by 1992 (1987 and 1989 are cited in most tables). This scenario assumes acceptance of Applicant's need projections.

Applicant utilizes average streamflow conditions in its "annual energy requirements and system resources" tabulations (Table 1-10). Under this projection mode, there would not be an energy deficit without Wiley for the next decade (using Applicant's need calculations and the listed resource pool); only one year out of the ten would be without surplus energy available for re-sale to to consumers external to the service area. Utilizing this planning mode, it could be argued that there is clearly no requirement for Wiley during the study decade.

Because the Idaho Power Company is a hydroelectric based system, producing over 70 percent of its generation from hydroelectric and the remainder principally from coal plants, it has inherent characteristics. For example, during adverse water years the hydro base is significantly depressed, producing large deficits, especially as forecast in the DEIS. Since the service area has a summer peak, although the summer and winter peaks are rapidly approaching equivalence, some of its hydro plants are vulnerable to a reduced output due to pumping from the Snake River. This system is extremely vulnerable during adverse flow years, and added hydroelectric capacity merely contributes to the intrinsic overall problem of high capacity during average or above average water years but fractional production during low water years. Base-load coal plants are not impacted by water year, and provide the system with stability during the depressed hydro generation cycles; however, as the DEIS discusses, future deficits, especially since the entire region is a hydro-based area, will be increasingly met with imported coal generated power from outside the service area (probably in the south). It could be argued that it is structurally jeopardizing to continue to exacerbate the poor production year deficit by adding new capactiy from hydroelectric sources that are susceptible to depressed water year power reductions. The average water year figures (Table 1-10) do not reflect shortage without Wiley Dam, and there would be "surplus" energy in nine of the ten years. Adverse water year data, on the other hand, projects incremental deficit with the addition of hydro plants to the system; in other words, following the pattern of the region, Applicant is continuing to set itself up for major shortfalls by further continuing the pattern of building its system by variable production hdyro. During a poor water year the structure of the grid depends most heavily upon coal resources, and the trend can only become more accentuated in the future. Wiley would have a swing in production of 44.97% between low and high flow years (Table 1-1).

In a hydro based utility, it is superficially attractive to use the average water year as a model base, because it could be construed as restricting over-building, at least on the surface. In fact, this mode implies that small hydro projects make substantial contribution toward meeting need, thus piecemeal develop-

Your opinion has been noted.

ent of hyro residuals seems viable, with the two coal plants scheduled to come on line in time to forestall deficits. The DEIS notes that even if all 18 applications for FERC exemptions (as of August 30, 1981) were granted (providing 26 MW of capacity), this would "not be sufficient, even in combination with all of the other potential hydro projects, to eliminate the need for additional capacity for the Idaho Power Company system" (1.3.2.2., page 1-22). The DEIS concludes that since all hydro electric potentials cannot meet their need forecasts, Applicant will still have to deploy coal-fired generation - whether in Nevada or Wyoming, or sited in Idaho. An issue linked with the addition of any capacity is that of the reserve margins required to buffer unpredicted conditions in the load or generating ends of the power delivery system. In a sense, relying as heavily as the Applicant has upon a system with as large a fluctuation in generating ability as does this hydro base places false security upon huge reserve capacity during favorable conditions, but leaves the system open to extraordinary shortfalls during depauperate production scenarios. More hydro continues to exacerbate this problem, while non-hydro systems do not; rather the stability of production narrows the high capacity margins and buffers the low years. This discussion should not be construed to indicate acceptance of the range of alternatives expressed in the DEIS, nor the Applicant's need projections, but sooner or later the issue must be confronted.

The Applicant plans to finance over a billion dollars of construction works during the next decade. If the hydroelectric projects the DEIS and the Applicant recognizes (and at this point it must be mentioned that these are only the tip of the iceberg in terms of upcoming projects, especially independent ventures), were consolidated in production and expense, they would significantly outweigh the coal-fire alternative in terms of expense, but not in production, especially in annual and maximum-minimum variation. Because of the present stagger in the system, serious deficits emerge in low flow years with or without the Applicant's proposed new hydroelectric projects. Increasingly under adverse water conditions base-load coal plants would be required to offset decreases in hydro production. The question persists, why does a hydro based utility do future planning for average rather than adverse water years? As George Anthony mentioned in his testimony at the scoping session (Transcript of the Hearing, July 28, 1981), "New generation of 6,600 megawatts of average energy is scheduled to come on line by 1990-91. Of this new generation, only 2 percent, or 165 average megawatts, is scheduled to come from hydro plants and other renewable resources. The remaining 98 percent is scheduled from generation at thermal plants." (page 167, discussion of Northwest).

An orderly development strategy could entail either building a coal plant now or in the very near future, which could meet several years of need, and have additional units added to meet decades of projected need (if it proved up), as it develops, but at the same time study the remaining hydro residuals so that these can be used with the most environmentally benign resources for the most cost-effective investment (mills/kwh) developed first. This course would allow conservation, independent small hydro, cogeneration, solar and other non-structural alternatives to mature, and provide a better gauging of their contribution. It would also contribute to reserve capacity and moderate impacts of adverse flow conditions.

Through this reasoning, Wiley, with a very high capitalization requirement (over $213 million dollars at a minimum), a marginal cost-benefit relationship (1:0.998, Application site; 1:10.08, Bliss Bridge site), cost/kwh very close to thermal alternatives (88.88 mills/kwh, Application site; 82.21 mills/kwh, Bliss Bridge site), and at demonstrated environmental, recreational and heritage expense would be one of the last of the hydroelectric resources to be considered. A fluctuation of 45% production between maximum and minimum years and additional unresolved geological problems also detract from the project.

Your opinion has been noted.

Alternatives to the Project In addressing Alternatives to the Project, priority should be given to those alternatives which could meet the A.J. Wiley Project's adverse case production during adverse flow year (i.e., 355.4 Gwh; Table 1-1), altneratives which are more cost effective (below 82.21 mills/kwh), alternatives (such as conservation and solar) which can be implemented rapidly, those which can be done within the budget of the Wiley Project ($213.91 million at at this estimate; Table 1-12), and those which do not require capitalization by the Applicant or its ratepayers. In terms of structural alternatives, priority should be given to base-load contribution sources which do not continue to extend the gap between hydro production in different water years.	Your opinion has been noted.
Non-structural Alternatives. Conservation - Alternative 1. Applicant has a number of conservation programs presently in place, and estimates of the potential of these programs have ranged from 22 to 34 MW (Bowler, comments of April 14, 1981) in residential end use areas alone. As Anthony noted, it is very interesting that residential end use per customer fell 4.6% during the second year following the water heater wrap program (Transcript of Hearing, July 28, 1982). This may have been due to different weather condtitions (warm winter, cool summer, etc.), but documentation by the Applicant (of wraps installed) mandates acceptance of 22 MW of energy saved. This must be regarded as a non-structural alternative; if installation of conservation technology is documented, it must be considered. FERC permitting and PURPA recharge do not apply to conservation, and the FEIS should accept documented conservation efforts as an alternative to construction. As the PUC Witness (McMahon) noted at the scoping session, the surface has just been scratched in commercial and industrial end use sectors. It has been suggested (Jan Birch, personal communication) that savings in these areas could range between 30 and 50% in potential, with conservation/solarization technologies available today. Since commerical end use comprises 17% and industrial enduse 34% of the Applicant's production (approximately 670 MW), savings potentials range between roughly 200 and 335 MW. The FEIS should include an alternative designing a commercial and industrial conservation program with a budget of $213.91 million having a goal of "saving" at least 335.4 Gwh annually that could be implemented by 1986 (the date Wiley is hypothesized as coming on line in Tables 1-10 and 1-11). Since the minimum potential may be over five times Wiley's adverse year production, it seems highly likely that this should be an alternative to the project, since conservation is usually more rapidly accomplished than construction works. Irrigation as an ends use comprises approximately 16% of the Applicant's production (summer peak time), with more use occurring during adverse water years. The FEIS should examine conservation in this end use as a possible non-structural alternative. "Building out" conservation in the residential sector should also be evaluated for potential, perhaps in conjunction with programs in other end uses. Conservation should be an attractive alternative since it more rapidly implemented than project construction, is consistent regardless of water year, and can be accurately documented and monitored as a savings. Documentation offsets the voluntary aspect of conseration.	Load reduction through conservation was considered in load projection estimates; therefore, conservation has been evaluated and determined to be needed as an adjunct to, but as not a valid alternative to, the proposed project. Development of major industrial and commercial conservation programs is beyond the scope of the impact statement and is the responsibility of the Applicant and the Idaho PUC. Staff does agree that such a program, adequately developed and directed toward irrigation, is a desirable adjunct to power development. Your opinion had been noted. See revised Section 1.2.4.1.
Solar - Alternative 2. With a budget of $213.91 million, Staff should examine alternatives in all end uses, or in combination, which could meet 355.4 Gwh of adverse year production by the A.J. Wiley Project within the timeline of the project. Solar has values similar to those of conservation it is non-structural (in the sense of a project), does not experience variable production under different water years, is documentable, and has other advantages (such as not suffering transmission loss).	Development of building codes requiring use of passive solar heating can aid in reduction of load growth and should be considered at the local level as an adjunct to future power development.
Purchase of Indpendently Produced Power - Alternative 3. Purchase of independently produced power at avoided cost prices saves the ratepayers and Applicant from bearing construction financing. I request that the Staff compile a complete listing of all exemption and preliminary permit (and license applications) filings, the Gwh they represent, their timelines for approval, and the potential times they could	See revised Section 1.3.2.2.

come on line with the Applicant. This compilation should include projects like Milner, which will soon be resolved (other comments are included elsewhere). If the PUC recognizes some 300 MW of indpendently filed potential, this should receive consideration as an alternative.

Loadshedding - Alternative 4.

Loadshedding is extremely valuable but probably would not contribute to the structural problems within the Applicant's resource base. It could greatly moderate need for peaking however.

Your opinion has been noted.

Structural Alternative

Coal-Fired Steam-Electric Plant - Alternative 1.

No response required.

In examining the adverse year impacts in Table 1-11, clearly the presently proposed structural solutions of the Applicant would not resolve the fundamental weakness in their system, rather adding many small dams to the grid would serve to exacerbate and widen the gap between average and adverse flow years , so that by 1991 an energy deficit would be built into the system of 1,428 Gwh. I respectfully request that Staff consider as an Alternative the consolidation of the proposed Wiley, Dike and Kanaka Projects, all new projects at various filing stages with the FERC, for comparison with a 250 MW coal-fired steam electric project.

All of the projects are hydraulically separate and independent. The development or non-development of any of the three would not affect the operation of the others. Grouping of the projects would promote a generalized hydropower evaluation in which the individual project benefits, costs, and environmental effects would be masked by the average effects.

Consolidation of these three projects is summarized below:

	Average Year	Adverse Year	Capacity Listing
Kanaka Rapids	112 Gwh	82	20 MW
Dike	99	72	70
Wiley	+485.4	+355.4	+ 86
	696.4 Gwh	509.4 Gwh	176 MW
Coal fired unit	1532 Gwh	1532 Gwh	250 MW
(if scaled to 176 MW for comparison:	1078.52	1078.32	176 MW

A 250 MW coal plant would produce 1532 Gwh consistently in average and adverse water cycles. This would be sufficient energy to pull the Idaho Power Company system out of its adverse water year problem for the next decade, and at the same time would make up for the average water year production sacrificed by not building three hydroelectric projects. This reserve capacity would buffer the Applicant's system against the predicted fegional deficit within the study decade. Clearly comparison of these two resource options (the consolidated 176 MW of hydroelectric capacity and the thermal alternative) indicates that the base-load thermal option is the only one which moderates and resolves the water year production difference. The consolidated dams would have a 27% margin production between average and (Wiley alone varies 45% between maximum and minimum years) adverse years. The next structural addition to the Applicant's system should be a component which will resolve the variability. The coal-fired option is the only base-load option that could accomplish this, and would eliminate adverse year deficit (except in 1991) in the system (having subtracted the production of the three dams). Actually, the consolidation could be extended to include several other projects that are independent, i.e. American Freedom Dam (proposed on the Snake River on the Ada-Canyon County line, which would inundate the Birds of Prey Research Area canyon bottom, threatening fledging raptors; ca. 20 MW); Eagle Rock Dam (ca.50 MW, would eliminate a well-known fishery and extend DO problems from American Falls Dam)- which would bring the capacity total to 146 MW for the consolidation package. For the sake of this DEIS, however, I am requesting only that a case be considered for the three Applicant-proposed projects. Advantages to this comparison should include a lack of burden upon ratepayers to finance three dams, then a coal fired plant in the early 1990s, it would allow maturation of conservation, solar potential, small hydro development and indpendent project development. It would solve the problem of the adverse water year, and in conjunction with indpendent power

Your opinion has been noted.

and conservation, could essentially meet growth requirements for the system for much more than a decade.	
I request that FERC construct a comparison such as Tables 1-10 through 1-12 evaluating the relationships between the three dams and a thermal unit. Information required for the comparison should be available from all three proposed projects, since preliminary permit documents contain the estimates needed. A survey should be presented of coal plants in adjacent states indicating which sites could accomodate another unit; a survey of sites within the service area should also be presented. Environmental impacts of the dams as opposed to a thermal unit should be discussed (see National Research Council, 1980).	See revised Section 1.2.5.
Miscellaneous comments on Section 1	
The 4% annual growth in use is extremely controversial. Could a Table be constructed for the Final EIS indicating, as do Tables 1-10 and 1-11, scenarios based upon 2.5%, 3%, 3.5%? These comparisons with the 4% model incorporated in the DEIS should give an accurate portrayal of potential surplus and shortfalls under more realistic growth patterns. As George Anthony (Transcript of Hearing, July 28, 1981) indicated, the first six months of 1981 saw the lower use than 1980. What did the second six month increment utilize? What was the growth by end use for 1981?	See revised Section 1.2.5.
In terms of investment, conservation has proven extremely valuable in Idaho. As George Anthony testified (Transcript of Hearing, July 28, 1981), "The cost of the electric hot water heater insulation jackets was approximately $5 million (to conserve approximately 22 MW), and it is projected to be $30 million for Kanaka Rapids (which Anthony indicates is equivalent to the hot water jacket installation in production)....You find that the insulation jacket program took two years to accomplish this. It is going to take seven years for Kanaka Rapids." In terms of meeting adverse flow year need, the 22 or more MW produced by conservation efforts would remain constant, while a hydro project would suffer loss of water and production capacity.	Your opinion has been noted.
Alternatives to the Wiley Project include a number of issues raised by Mr. McMahon (PUC) during the scoping session of July 28, 1981, held in Gooding, Idaho. For example, what is the potential within the Applicant's service area for co-generation and biomass, and what is the implementation time-line? It is my understanding that the Applicant has negotiated with wood products industry and food processors in this regard.	See revised Sections 1.2.5 and 1.3.2.2.
What is the potential for geothermal (MW) in the Service Area, and what are the projects planned for the near future (within a decade)?	See revised Section 1.3.3.3.
What is the potential (MW savings) for the Applicant's weatherization program ("one of the most extensive water wrap programs in the United States") and when will these results be fully realized?	Section 1.2.3.1. estimates that more than 75 percent of the residential water heaters in the service area are now insulated and that the annual energy savings may approach 80 million kWh in future years. Staff believes that this estimate is adequate for planning purposes.
What kind of energy savings can the service area anticipate through conservation in agricultural and commercial areas? When will the projected residential programs reach their goals?	See revised Section 1.2.4.1. See Appendix A. No conservation programs are in existence for the irrigation sector at this time although one is being planned.
According to McMahon, by July 1981 "there have been close to 300 MW of FERC filings in about the last seven or eight months." This potential includes many environmentally benign projects, and would not require Applicatn to further extend its financial resources by additional capitalization costs for construction. What is the status of independent industry interest in constructing a 500 MW coal plant of its own (page 65)?	See revised Sections 1.3.2.2 and 1.2.5.
As Mr. McMahon, representing the IPUC stated at the July 28 meeting, "...And finally, probably the biggest ommission in the document in that whole area is the small hydro resources. As a result of avoided costs in the 55, 60 mill area, there have been in Idaho close to 300 megawatts of FERC filings in about the last seven or eight months. Those are not reflected in the document." Nor are they in the DEIS. I request that a table be prepared indicating all FERC exemption filings in the Service Area, their capacity production, and the timeline for exemption decision. Similarly, how many filings for hydroelectric power water rights were placed with the Idaho Department of Water Resources in the last three years? How many have been granted, and what is the timeline on the remainder? What kwh potential do these represent?	

In Table 1-7 and in paragraph 2 (page 1-11) it is indicated that Applicant's conservation program can save the equivalent of 28.88 MW. When will this goal be accomplished? If these savings are realised, why isn't conservation regarded as an alternative to construction?	See revised Section 1.2.4.1.
In paragraph 3 (page 1-12) it was noted that residential consumption dropped 700 kwh per customer between 1979 and 1980. Was this trend perpetuated in 1981? How does this 4.6% mean decrease per residential customer affect forecasting? Is this decrease reflected in the 4% growth projections?	See revised Appendix A.
1.2.5.3. How does the 4% annual increase in load break down by end use? Does this include an estimated 30% decrease in new hookups due to the line extension rates, the 4.6% mean decrease in annual residential end use (page 1-12), conservation impacts of up to 28.88 MW (although early estimates ranged as high as 34 MW), and recent new conservation efforts such as the fluorescent lamp replacement program? What plans does Applicant have for pursuing conservation in commercial and agricultural end use areas, what is their potential (greater than 30% savings?), and when could this see implementation? How will recent PUC rate changes impact new irrigation hookups? The 4.6% decrease in annual residential end use couls reduce residential end use sales, bringing down energy sales by 1.3% (Table 1-2) - presumably despite new hookups. What are the 1981 figures for Table 1-2?	See revised Appendix A.
Project initiation and completion dates as presently scheduled are not pragmatic (on line by 1896 in Tables 1-10 and 1-11). This seriously impacts the project because other, more economically cost-effective projects, such as the two thermal plants, numerous hydroelectric projects, conservation benefits, and reductions in need due to changes in rate structure by the PUC, follow close upon its heels. Additional data requirements will likely postpone project decisions for some time. Novel geological studies utilizing standardized methodology with an acceptable sample size will be costly and time consuming. A third party relationship in this sensitive situation would enhance creditibility of data. This project will not be on line in 1986, as expressed in Tables in Section I.	Staff sees no reason why the proposed project or a modified alternative could not be on line by May 1986 if the Commission were to issue a license for development.
The discussion of solar in the IPCo document is extremely inadequate. There are three solar subdivisions planning to open this spring in Boise; the suggestion that solar will meet 5% of the space and water heating needs in the IPCo service area by 1990 is far too low. It seems likely that the IPUC will soon issue an order authorizing a large scale (ca. 300 unit) demonstration program for solar water heaters, to be financed by IPCo, UP & L, and (a few by) WWP. The California PUC has initiated some interesting work on solar assisted irrigation programs. This potential should be discussed.	Your opinion has been noted.

As EPA suggests (see A6.6 in Application comments section), "Although the proposed project is primarily a base or intermediate load powerplant it also would serve seasonal and daily peak loads. Alternative means of matching peak loads with available power resources merit consideration in the license application. Specifically, load management techniques such as time of day pricing and load shedding during peak load hours merit discussion. It is our understanding that the state-of-the-art for the hardward available to implement load management practices is advancing relatively rapidly and therefore it may soon become cost competitive with the construction and operation of new peak power generating facilities." Since this comment was not specifically addressed, I am reiterating it.

The discussion of Applicant policy toward the development of non-hydro and non-thermal alternatives should be expanded. What percentage of its output does IPCo anticipate will be fulfilled by solar (non-hydro sources) and other means by 2000, for example? California utilities have estimated as much as 30% of their power production will be through these means (excluding even conservation). PG & E expects to produce 150 MW through a single wind generation field by the end of the decade (with most of the units being installed by 1985).

The California PUC has issued findings of commercial availability for generation and non-generation technologies (see Docket No. 80-BR-3) which are far more optimistic than those suggested by IPCo. IPCo is not as optionless as it contends.

The Solar Energy Association of Idaho has recently completed a study collecting available solar radiation data "monitored in Idaho and then examined this data to determine the potential for solar domestic water heaters and for passive solar homes". Their study, "Idaho Solar Data Manual", has found that "with solar domestic water heating system, residents can save from 56% (Rexburg) to 78% (Pocatello) of total water heating loads per resident. The hypothetical system evaluated cost approximately $2776 (1978 dollars) Total savings from the solar system (fuel, taxes, etc.) equaled mortgage principal in ten (10) years or less at each site when using electricity as a back-up. Furthermore, when evaluating passive performance the computer simulation showed a home with trombe wall and mass floor was able to meet from 49% (Idaho Falls, Pocatello) to 68% (Boise) of the yearly hear requirements of the home. The economic analysis showed that the model solar home was cost-effective in all the Idaho cities which were modeled in this study"

(Lewiston, Moscow, Boise, Kimberly, Idaho Falls, Rexburg and Pocatello).

This study suggests extensive potential exists in the residential space-heating and water heating loads. If these loads are estimated to be in the vicinity of 1,058,712 MWH* for space heating and 1,568,818 MWH for hot water heating, and one used a median percentage potential for each of the potential estimates developed by this study, a savings of 32.6% (or 1,051,108 MWH) of the water heating load could be saved year-round, while some 22.1% of the space heating load (principally winter) or 608,759 MWH could be achieved through solar means. Perhaps the FERC could address an inquiry to the Idaho Solar Energy Association for a more accurate estimation based more closely upon actual load demands in individual cities monitored and for an assessment of exact potential within the IPCo service area. If the cost per Kwh of these systems is compared with A.J. Wiley at 82.21 mills/kwh, they become attractive, especially when they are "paid off" in ten years - while new hydro plants are ammortized over a 50 year period.

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Applicant's system, which is primarily hydro generating capacity, is energy limited rather than peak limited. In this system, load management techniques would not contribute to energy savings to the same extent as to peak load savings.

If residential use continues to utilize around 31% of the Idaho Power Company's production, simply employing the potential space and water heating savings would gain Idaho Power Company somewhere in the vicinity of 18% of its load (even a greater savings would occur in the winter). While the production of a hydro-based company like Idaho Power varies with the water year, there is no question that these savings could be four to five times the anticipated production of the A.J. Wiley Project.

*See Idaho Energy Facts, Table 52 (page 113) and Figure 28 (page 181).

Excerpt from Table 52 (page 113):

Idaho Electricity Consumption by End Use Sector (1974-1978)
(Thousand Kwh)

Year	Residential	Commercial	Industrial	Other	Total
1978	4,812,325	3,629,883	5,339,469	82,394	14,864,091
X % of total	31	25	44	—	100

Figure 28 (page 181)
Idaho's Residential End Uses of Energy

Space Heating 67.6%
Water heating 14.3%

however, Figure 29 (page 182)
Idaho's Residential End Uses of Electricity

Space Heating 22.1%
Water Heating 32.6%

What are the analogous figures for 1978-1981?

A complete and accurate survey of all potential small-power production options is absolutely necessary. It is mystifying that the Alternatives to the Project section did not mention this aspect of PURPA implementation. As is discussed above, there were 38 new hydropower filings in the southern region and 105 new hydropower filings in Idaho during 1980.

There has been no accurate survey of small power potential in the Idaho Power Company service area. The Idaho Citizen (Vol. 4, No. 5, April 1981, p. 3 "You can put in your own renewable energy plant and sell the excess power to your local utility") states "Just in Southwestern Idaho, said Winterfeld (Curt Winterfeld, director of the research and consumer division of the Idaho Public Utilities Commission), "you are probably talking about a couple of hundred megawatts in potential small hydro projects". This potential should be developed before any new major utility developments are undertaken. According to High Country News (March 20, 1981, Cogenerating Electricity: Idaho's new energy source stumbles in regulatory darkness by Michael Moss), "The power potential from another source, small, abandoned and new hydropower sources, could top 400 megawatts a year, according to studies."

There is probably more potential for conservation/solarization in the commercial sector than any other (Jan Birch, personal comm.) - probably 30-50% energy savings.

California and Idaho (mostly WWP but also IPCo and UP & L) are starting irrigation pump-testing programs, which may be able to cut irrigation loads by 15-30% (irrigators purportedly being the single largest consumer of electricity in Idaho). This potential should be adequately discussed.

See Section 1.2.1.

See revised Sections 1.3.2.2, 1.2.5., and 1.2.4.1.

Since the Applicant is a partial owner in a number of coal plants, could another unit be added at any of the presently sited plants in which the Applicant has joint ventureship?	The capacity of existing plants jointly owned by the Applicant has been reflected in the resource plans.
What is the difference in cost in establishing a new coal-fired steam-electric plant, as opposed to putting an additional 250 MW unit at an existing facility in which Applicant has partial ownership?	It is generally assumed that it would cost more to construct a new coal-fired, steam-electric plant than to add a 250-MW unit at an existing facility in which Applicant has joint ventureship. However, the magnitude of this difference, if it exists, is a function of the type of joint financing arrangement, and of any common facilities, such as land, rail transportation facilities, and structures that are acquired or constructed with the first unit. We cannot speculate on the latter variables or on any differences in the resulting cost.
Are there any sites in adjacent states where there are extant coal plants which could accomodate an added unit should the Applicant consider investment in a facility in which it presently has no ownership?	There are no such sites to Staff's knowledge.
What would be the cost of establishing a new 250 MW coal plant at the hypothetical Bliss site?	$517 million.
Since it seems unlikely that the Applicant would construct only a 250 MW unit at a new location, what would be the cost to upgrade transmission facilities at Bliss to accomodate a second unit?	The question is moot because the alternative is only a portion of one 250-MW unit.
Applicant has forecast need at the high rate of 4% annual growth; what was the annual increase in growth by end use each year for the past five years (including 1981)? What were Applicant's forecasts for these years by end use?	See Idaho Power Company 1981c, 1981d, or Appendix A.
How many contracts has the Applicant signed with independent small power producers, and how many kilowatts (or megawatts) does this contribute to the grid? How many additional contracts are being negotiated?	Applicant indicates that a tariff rate has not been set for small power producers, and that currently such rates are set on a case-by-case basis. In accordance with PURPA instructions, however, an energy cost of 67 mills per kWh has been proposed to reflect a 65 percent capacity factor, 35-year contract. See also revised Section 1.3.2.2.
How many of these independent small power producers are presently on line? When will the remainder of the contracted power come on line?	
What is the present avoided cost value for Applicant purchase of independently produced power?	
I request that a listing be provided, in Tabular format, citing all of the exemption permit filings with FERC for small hydro in the Applicant's service area. How many kw or MW do these combined filings represent? When could they come on line, if granted?	Staff disagrees. The total contribution of the individual projects is adequate for the purpose of an environmental impact statement. See revised Sections 1.3.2.1, 1.3.2.2, and 1.2.5.
What is the estimated construction cost and mills/kwh for each of the projects cited in 1.3.2.1. (Major projects of Applicant for which a Preliminary Permit has been issued or an application for License filed)	This information would be inadequate for analytical purposes, because estimates included in permit applications are not reliable.
Please construct a Table citing all values listed in Table 1-12 comparing all of these hydroelectric proposals with A.J. Wiley, the coal plant (Bliss site) alternative, and installing a new unit at an existing plant.	Staff can see no value in such a table since the environmental impact statement compares the project to reasonable alternatives. See revised Section 1.3.5.
On page 1-22, three indpendent plants with a capacity listing near that of Wiley are cited (85 MW of capacity). What is the current avoided cost price in mills/kwh, should they come on line in the near future? Why isn't the Milner Dam project - with two competing applications for 60 and 120 MW pending and likely to see resolution soon - included here? When is the projected time these independent developments could come on line with the Applicant?	Cost estimates at the preliminary permit stage are not very reliable. See revised Section 1.3.2.1. FERC denied applications on two additional preliminary permits in August 1981.
What are the 1981 figures for Table I-2? These should be incorporated in the Final EIS.	Information was not available at this time.

2-5; pars. 5	The relocated Shoestring Road should be paved.	See Section 2.1.2.3.
2-12, 2.1.2.6.	paragraph 2, sentence 1. This sentence should read, "A total of 212 acres of Federal lands would be affected by the project." Riparian habitat on the public lands should not be regarded as "vacant." The BLM is aware of the significant value of riparian habitat and has considered ACEC recognition for the Wiley Reach riparian area.	See revised Section 2.1.2.6.
2.1.9.2.	Cost Considerations. There should be a figure indicating where the proposed grout lines would be. At this point, Applicant's data is insufficient to demonstrate if grout lines would be successful in terminating water loss. Costs should be estimated for additional geological studies. Costs should be developed for channelization of 4000 feet of Snake River at the Bliss Bridge site and for excavation and extension of the foundation of the dam shell to Banbury Basalt. This project is extremely marginal when compared with the coal alternative, and it is important to quantify costs where possible, since the project's cost effectiveness is poor.	A figure showing the location of a groutline would not enable the reader to assess the effectiveness of a grouting program. Staff included the costs of an effective grouting program in the project cost used in the economic evaluation of the project. See revised Sections 2.1.9.2 and 1.3.5. See revised Section 1.3.1.2. The cost estimate, as modified and used in the environmental impact statement (Section 1.3.5), is a conservative estimate, taking into account worst-case foundation conditions, and is fully adequate.
3-3	The significance of soils along the Wiley Reach is greater to the riparian habitat than to agriculture. Soil mapping is of importance in establishing mitigation sites and matching these with compatible species for re-introduction.	See Section 5.2.1.1.
Figure 3-3	This is an excellent interpretation of the ontogeny of Root Lake, Root Lake Clay, and McKinney pillow in the project area.	Your opinion has been noted.

3-10, paragraph 4	At some point in the document all of these problems should be presented together, perhaps as a Table, with Applicant's proposed solutions and alternate solutions. Why was this not done?	See revised Table 4-5.
3-14; para. 3	The nomenclature of the springs in Figure 3-6 has changed somewhat since Stearns (1938). Recent studies by the U.S. Geological Survey (Covington, 1982, in preparation) have indicated many previously unmapped springs along the Reach, and have assigned numbers to them rather than utilizing the confusing nomenclature of the past. It is extremely useful to have Figure 3-6 in the Draft E.I.S.	No response required.
3.1.5.	Threatened or Endangered Species. Applicant (Idaho Power Company, 1980, Exhibit I) cites the American Peregrine Falcon as a casual visitor to the Wiley Reach area.	Staff did not find any confirmed sitings of the peregrine falcon in the project area.
	The Bliss Rapids Snail, a candidate threatened or endangered species, should be included in this discussion (Federal Register 45(80): 27723). The Bliss Rapids Snail has been found at sites throughout the Wiley Reach, and all of its present distribution is threatened.	See revised Section 3.1.5.
	Fisherola nuttalli, a limpet-like snail, is another candidate endangered species which should be treated in this discussion. The U.S. Army Corps of Engineers (Seattle District) study of the "Impacts of Ben Franklin Dam: Hanford Reach Study Report" (September, 1981) identifies this species as an obligate fast-water, large river species and a candidate endangered species.	Fisherola nuttalli is not listed as a candidate endangered species by the U.S. Fish and Wildlife Service.
	"(c) Aquatic Organisms. Fisherola nuttalli nuttalli (giant Columbia River limpet) has only been reported in flowing water and has been found generally throughout the Hanford Reach. Over the past 40 years, all specimens of this species identified by the University of Michigan and the Museum of Natural History have been from the Hanford Reach. The limpet, once found throughout the Columbia and Snake Rivers prior to impoundment of suitable habitat, is considered to be restricted to the Hanford Reach and has been recommended for Federal status as an endangered species. Currently, the FWS has identified F. nuttalli nuttalli as a candidate species for Federal listing. The Ben Franklin Dam alternative would eliminate nearly all of the limpet's present habitat and, as a result, this species could become extinct" (U.S. Army Corps of Engineers, 1981).	
	The Wiley Reach comprises excellent habitat for this species, and is near the upper limit of its distribution in the Snake River. Suitable habitat for the species has become limited, and the significance of any additional habitat loss should be discussed. This area is an isolated island of habitat and is necessary if the species is to remain in the upper Middle Snake River.	
	The significance of the endemic mollusks beyond their being candidate endangered species should be recognized in the Final EIS. Both the Bliss Rapids Snail and the Snake River Physa Snail are living fossils which once had greater distributions, but whose modern range is restricted to the free-flowing Snake River. The Bliss Rapids Snail is the sole representative of an undescribed endemic genus. It is a significant	Your opinion has been noted. See revised Section 3.1.5.2.

taxonomic and evolutionary example as an isolated adaptive radiation with no other examples in the genus. These relicts of Pliocene (Bliss Rapids Snail) and Pleistocene (Snake River Physa Snail) lakes are an important part of the natural heritage of this area. They are an exciting living link with the geology and history of the Snake River in southern Idaho. The following excerpt from Bowler (1981) describes the significance of the molluscan endemics which the specialized microhabitats of the Wiley Reach supports:

"An undescribed monotypic genus in the Hydrobiidae which is restricted to fastwater habitats occurs throughout the Wiley Reach (its type locality) where the habitat is suitable. This species, the "Bliss Rapids Snail," is a remnant of a unique molluscan fauna associated with the Blancan "Lake Idaho," which has been dated as Pliocene at approximately 3.5 million years. After the drainage of Lake Idaho, which deposited the Glenns Ferry Formation, the diverse molluscan fauna which had been associated with it became extinct. Mollusks and fish fossils from the Glenns Ferry Formation have been critical to the understanding of the drainage history and faunal origins of the Snake River. The Bliss Rapids Snail is present in fossil form in the Glenns Ferry Formation. During the Pleistocene a series of smaller lakes which deposited the Bruneau Formation occurred across southern Idaho, however, the faunal affinities were modern. The Bliss Rapids Snail, which inhabited the well-oxygenated surf zone of Lake Idaho, persisted in the Snake River in a few fast-water sites, the Wiley Reach being the best example surviving. A generic and species description of this species will soon be published by Dr. D.W. Taylor. The Bliss Rapids Snail is a candidate endangered species currently undergoing status review (see Federal Register 45(80): 27723).

Another undescribed endemic species is the Snake River Physa Snail, which occurs in fast water habitats and is often associated with the Bliss Rapids Snail (see Taylor, 1981a; 1981b; Federal Register 45(80): 27723). This species is very rare and has been recovered living only from the Wiley Reach. The ancestral distribution of this species included Pleistocene lakes from Idaho to Nevada and Utah, and the Snake River of southeastern Idaho; however, only a relict population remains (Taylor, 1981a). This species is restricted to deeper water of rapids in the main stream of the Snake River. Like the Snake River Physa Snail, the Bliss Rapids Snail and several other more widely distributed species such as Lymnaea hinkleyi, which occurs spottily in the Snake River but not in its tributaries, are large river (or Snake River) obligates. As Taylor (1981b) states, "Only about 20 species of freshwater mollusks characteristic of large rivers are known in the western United States. Volcanism, tectonic activity and climatic changes have rarely allowed large stream habitats to endure in the region. In contrast, species and even genera restricted to large rivers are numerous in the southeastern United States. There the habitat has been stable for a long time, permitting the evolution of a special fauna. From their fossil record, the western American species are known or inferred to have a Miocene or Pliocene origin." The Snake River Physa Snail is a candidate endangered species presently undergoing status review (see Federal Register 45(80): 27723)."

	All of the distribution of the Snake River Physa Snail is threatened with hydroelectric development.	Your opinion has been noted. See revised Section 4.1.7.3.
3-33	Noteworthy rare, candidate endangered, or threatened species potentially in the Wiley Reach terrestrial habitats include Astragalus atratus Wats. var owyheensis (Nels. and Macbr.) Jones, Astragalus calycosus Torr., Astragalus purshii Dougl. var. ophiogenes Barneby, Ivesia baileyi Wats., and Mentzelia torreyi Gray (see Idaho Power Company, 1980; Henderson, Johnson, Packard and Steele, 1977). The populations of Astragalus purshii var. ophiogenes occur on fragile gravel and sand habitats, and comprise one of less than two dozen known localities for the species.	This section refers to Federally listed threatened or endangered species. Of the species you listed, one, Astragalus purshii var. ophiogenes, is listed as a Federal candidate species and has been recommended to be dropped from this status. Other species you mention that may occur in the proposed project area have the following status, as determined by the Technical Committee of the Idaho Natural Areas Council in the June 1981 publication, Vascular Plant Species of Concern in Idaho: Status Astragalus atratus var. owyheensis — Federal watch list* Astragalus calycosus — Not listed* Iverisia baileyi — State watch list* Mentzelia torreyi — Federal watch list*
Pg. 3-16; para. 3	The USGS had a gaging station not far above the Bliss Bridge Alternative Site which was operative for several years before abandonment. The King Hill gage is an accurate approximation of the discharge at either of the Wiley Damsites, as used here.	Your comment is noted. See Staff's response to your comments on Section 3.1.8.
3-22	This is an excellent discussion of water quality issues in the Reach. This analysis indicates strong potential for algal blooms and attached macrophyte proliferation in the Wiley Reservoir. There would be a sequence of water quality deterioration from Lower Salmon Falls to Wiley to Bliss reservoir, especially for DO decrease, with eutrophication becoming marked in the lower two pools.	See revised Section 4.1.4.1.
Pg. 3-25 Table 3-5	As I mentioned in my comments on the Application (April 14, 1981), several other species have occurred in the Wiley Reach. Introduced coho salmon were not uncommon several years ago and at least one large brown trout (four pounds) has been caught in the Reach. Historically, two runs of chinook salmon, steelhead trout, Pacific lamprey, and cutthroat trout occurred in Wiley Reach (see my comments of April 14 and November 23, 1981; Evermann, 1896; Gilbert and Evermann, 1895). It would be useful to indicate which references recorded each species, since many of the species reflected in Table 3-5 no longer occur in the Reach. For example, Lepomis spp. are very rare (vagrant occurrences): largemouth bass and yellow perch no longer inhabit in the Reach; the concensus seems to be that the Catostomus species present is C. macrocheilus (see Simpson and Wallace, 1978; although the two species do interbreed and other species have been found in the area, especially by Hubbs and his co-workers; vagrant individuals of other species have been observed by me); the dace at this site is apparently Rhinichthys osculus, although R. falcatus has been found elsewhere in southern Idaho and could occur here. Bullheads and channel catfish are very uncommon in the Wiley Reach, while smallmouth bass seem to be more common now (though still not frequent in catches) than a decade ago.	See revised Section 3.1.3.2. Note that Table 3-5 lists species that have been reported by various researchers in the reach between Bliss Dam and the Lower Salmon Falls Dam, and is not restricted to the Wiley Reach.
Pg. 3-27; para. 2	Historically, the white sturgeon occurred from Auger Rapids downriver in the Snake River, and I know several people who fished for (and even commercially sold) sturgeon from the Wiley Reach area. The depressed population of the Wiley Reach today does not detract from the value of the Reach as white sturgeon habitat. This site could be stocked with sturgeon and brought up to viable levels able to support a sport fishery - probably still catch and release until the dynamics of re-stocking habitat is better understood. Doroshov (1982, in press)	No response required. Your opinion has been noted.

		and Doroshov et al. (1982, in press) describe in detail how to undertake sturgeon aquaculture, and a sturgeon "ranch" is being initiated by a private individual near Bonneville Dam. The point is that in terms of white sturgeon, we are not in a triage situation where only large populations should be protected. Today we have the feasible, economically attractive methodology to enhance all of our surviving habitats and populations, so that no argument based on presently depauperate populations can hold water. Enhancing depressed populations in good habitat does not detract from or substitute for natural reproduction in sites with larger, demonstrably reproducing populations. The value of the Wiley Reach as excellent habitat should not be downplayed. If the project goes in, mitigation should be required; should Wiley not be built, this site could support a white sturgeon fishery. (In fact, final recommendations for section 4(h) of the Regional Power Act are likely to reflect stocking of all surviving habitat.)	Your opinion has been noted. Staff's recommended mitigation for white sturgeon is discussed in Section 5.2.1.4. Your opinion has been noted.
3.1.3.3.	3,27	Staff discussion of the insect invertebrate communities is good, but the extraordinary assemblage of molluscan species should be mentioned. The molluscan fauna of the Wiley Reach is nationally significant. The fauna at this site is composed of an assemblage of elements which reflects the geologic history of the Snake River, including relict species from Pliocene and Pleistocene lakes, "big river" species restricted to the Snake River which entered the river system at different times, and widespread elements. This area of the Snake River is the only Columbia River tributary west of the continental divide with an endemic genus. The species assemblage at this site is unique, and is part of the natural history heritage of southern Idaho.	See revised Section 3.1.3.3. See revised Section 3.1.5.
3.1.4.1.		Boccard (1980) indicated that less than 0.1, rather than 0.6% of the land area in Idaho contains riparian vegetation of this category. Riparian vegetation of the kind along the Wiley Reach is much more limited than the general 0.1% category, and the Wiley Reach has Unique Ecosystem aspects in terrestrial vegetation than cannot be duplicated elsewhere.	Section 3.1.4.1 describes the general riparian community in the Wiley Stretch that does contain cottonwoods and willows. Therefore, the use of the figure of 0.6 percent of the land area of Idaho is riparian vegetation. Section 3.1.4.1 indicates that segments of the riparian community (e.g., Celtis, Rhus, Betula) are found in only 0.1 percent of the land area of Idaho.
3.1.4.1.		3.1.4.1. is a good general description of the riparian habitat. This site has a rather unique deciduous riparian woodland formation, described by Bowler (1981) as follows: "The Wiley Reach has a remarkable riparian vegetation. The N.S.F. study (1980) identified 152 species in 115 genera representing 45 families along a set of transect lines on the north and south banks of the Wiley Reach. Of these species, 72% are native species with the remaining 28% being introduced, principally from Eurasia. Interestingly, the majority of the species are perennials (77%), with herbs and grasses comprising 78% of the species recorded. The low proportion of annuals reported in the study (23%) was due to the season that the sampling was carried out (June through September), so that spring flowering annuals were not sampled. In contrast to the high number of species in the Wiley Reach riparian habitats, sampling along the adjacent Lower Salmon Dam impoundment indicated a much lower species diversity with only 54 species identified."	See revised Section 3.1.4.1.

The N.S.F. study identified four plant groupings using several statistical methods (the CeskaRoemer computer program to elucidate species releve groups and Hill's reciprocal averaging ordination technique). "Community I" comprised a narrow zone adjacent the river which experiences periodic flooding. "Community II" occurs above the flood zone and varies in breadth according to water availability and steepness of slope. A gentle slope above the flood zone can allow the development of a third community, which includes three of the dominant shrub and tree species, Celtis reticulata (hackberry), Betula occidentalis (birch), and Rhus trilobata (squawbrush). These three species form nearly pure stands at many sites along the Wiley Reach. Above the three riparian communities is the Great Basin Sage community, which usually occurs near the upper third of the inner V of the riparian corridor. The remarkable species diversity and large representation of native species in the riparian communities at this site is significant. The site is unique among the free-flowing reaches in this area of the Snake River, with the Dike Reach downriver having little riparian vegetation and the up-river reaches having very different dominant perennials and species compositions (lacking the large groves of hackberry and birch, for example)."

See revised Section 3.1.4.1.

Deciduous Riparian Woodland

"The Wiley Reach includes two formations of deciduous riparian woodland, extensive Celtis reticulata stands of astonishingly large individuals and extensive stands of Betula occidentalis. Deciduous riparian woodland is extremely sparse in Idaho, comprising less than 0.1% of its habitats, and little of this vegetation type has been protected (Boccard, 1980). The hackberry stands are particularly significant, as the individual trees are frequently much larger than species descriptions accord the plant as achieving; they are also very probably the largest stands in the state. The birch association is the best developed in the Hagerman Valley and Thousand Springs area."

Your opinion has been noted.

As the USFWS/IDFG mitigation plan recognizes, the structure and function of riparian habitat, especially in an area with deciduous riparian woodland such as the Wiley Reach, is a major factor in maintaining passerine or songbird species diversity. Jensen (1980) identified 83 species of birds along the Wiley Reach with particularly high numbers of passerines. By contrast, Lower Salmon Falls had only 45 species, most of which were waterfowl. Sensitive or special concern species recorded from the Wiley Reach include the white pelican (Pelecanus erythrothyncos), snowy egret (Leucophovx thula), black-crowned night heron (Nycticorax nycticorax), osprey (Pandion haliaetus), bald eagle (Haliaeetus lecocephalus), ferruginous hawk (Buteo regalis), Caspian tern (Hydroprogne cuspia), the burrowing owl (Speotyto cunicularia) and the double crested cormorant (Phalacrocorax auritus) (Jensen, 1980; Bowler, 1981).

Staff agrees. Sensitive wildlife species are included by reference in Section 3.1.4.1.

3.1.4.3. Other Terrestrial Communities

Other Specialized Habitats. The Wiley Reach has good examples of vegetation associated locally with specialized habitats, particularly Melon Gravel and other alluvial deposits such as gravel terraces, Root Lake clay, and McKinney pillow lava. Astragalus purshii var. ophiogenes, a species known from very few localities (discussed above), has more than a dozen populations on cut gravel terraces and sandy sites along

See revised Section 3.1.4.3.

	the Reach. Other species associated with these kinds of sites, such as *Astragalus nudisiliquus*, are also present.	
3.1.5.	Applicant cites the American Peregrine Falcon as a casual visitor to the project area, as well as the Bald Eagle (Idaho Power Company, 1980, Exhibit I, page 16).	Staff did not find any confirmed sitings of the peregrine falcon in the project area.
3.1.6.2.	Recreational Resources. This is an excellent presentation of the recreational resource use along the Wiley Reach. I have made detailed comment on the Applicant's recreation survey (November 23, 1981). Paragraph 2, 3-40, Wiley Reach is included in the National Rivers Inventory. Paragraph 4, 3-40, should mention that the Malad Canyon, including the reach from the confluence with the Snake River to the first impoundment, has been found eligible for National Natural Landmark recognition. The recreation description of the Wiley Reach should mention that the riparian corridor and adjacent agricultural areas support excellent upland game bird hunting for pheasants, quail, hungarian partridge and that the river and spring systems provide good waterfowl hunting. Cottontail rabbits also occur in the riparian habitat. During both the Applicant and Student Originated Study sampling period hunting season for upland gamebirds and cottontail rabbits was closed.	See revised Section 3.1.6.2. The Malad Canyon and Box Canyon applications for National Natural Landmark designation have been subjected to independent scientific review and found to have features of national significance. The applications have been forwarded to NPS Headquarters for further processing. Until such time as formal nominations may be presented to the Secretary of the Interior, the areas must be considered as potentially eligible for recognition. The A.J. Wiley nomination has not yet been subjected to independent scientific review.
3.1.7.	The description of visual resources is accurate.	No response required.
3-45, 3.1.8	Cultural Resources. As I mentioned earlier in my comments of April 14 and November 23, 1981, there are still a number of sites which should be surveyed during the salvage operation and prior to construction. The encampments recorded by Palmer (1827), Fremont (1845), Steward (1938), Spaulding (1953) and others at Lower Salmon Falls were not located.	Staff has reviewed the Applicant's archeological reports, and your comments of April 14 and November 23, 1982; the only impact area that has not been surveyed for prehistoric and historic sites is an island in the Snake River in the central portion of the proposed project. Staff has noted in the text of the FEIS that the island has not been inventoried, and has requested that a survey be undertaken of this location. (See revised Section 3.1.8 and 5.2.1.7.) It may be possible on the basis of historical records to identify site 10GG170 (not 10GG171) as the referenced stream-gaging station. The material remains at the site are minimal, however, and have little value for describing the construction or other attributes of the station. Historical information describing or documenting the location of the gaging station would not change the opinion of the Staff and the SHPO that site 10GG170 is not eligible for the National Register of Historic Places. The other sites referenced in your letter of comment lie outside of the project impact areas, or have been removed or destroyed in previous actions unrelated to the proposed project, and require no further investigation.
Table 3-7	As I suggested in previous comments, site 10GG171 could be the USGS gaging station located in this vicinity, prior to its abandonment in the 1940s.	
3-49; para. 3	If 10GG171 is determined to be the USGS gaging station, its dates of operation should be estimated.	
3-57; para. 1	Other measures are needed to protect the site from leakage (discussed elsewhere).	No response required.
3-59; para. 1	*Cottus leiopomus*, the Wood River Sculpin, has not been verified from the Thousand Springs tributaries. It is possible that the species might exist in the headwater springs of Malad River since they are the terminus of the Wood River drainage, in which the species has been recorded as far downdrainage as Shoshone (the type locality).	Your opinion has been noted.
3-59; para. 2	The Bliss Rapids Snail and *Fisherola nuttalli* should be incorporated.	See revised Sections 3.1.3.3 and 3.1.5.
4.1.1.2.	If the Shoestring Road were paved after relocation the dust in this section of the valley would be reduced, especially considering post-project use estimates.	Your opinion has been noted.

4-9; para. 3	Approximately 185 KW of independent small hydro power would foregone, and pending FERC exemptions for three other sites would not see future development.	See revised Sections 1.1, 4.1.4.1, and 1.3.2.3.
	As I stated in earlier comments (April 14, 1981), disturbed sites could be planted to provide soil-holding cover which would reduce dust. The mitigation measures proposed in 4.1.3.2. are excellent and should be extended to include post-project landslide sites.	Such measures would be provided by Staff's recommended soil erosion, dust, and slope-stability control plan. (See revised Section 5.2.1.5.)
4.1.3.1.	Similar to 4.1.1.2., these effects should be significantly reduced by planting wherever feasible.	See revised Section 5.2.1.5.
Pg. 4-3; para. 1	Landslides of Root Lake Clay would produce significant turbidity in the impoundment. This has occurred historically along the Wiley Reach.	See revised Section 5.2.1.5.
	A site that should be carefully watched is the major slide that is slowly pinching the river approximately a quarter mile below the old King Hill siphon site. Prior to filling of the reservoir, this site should be re-examined and it should be monitored during filling. Root Lake clay can slide quickly if there is sufficient slope. A review of aerial photographs of the Wiley Reach indicates that there have been a number of substantial Root Lake clay slides, principally caused by irrigation runoff. Some of these historic slides happened as a single massive event.	See revised Section 5.2.1.5.
Pg. 4-3; para. 3-4	The Bliss Grade ("old" Highway 30) passes through the Bliss Landslide area and is expensive and difficult to maintain with present vehicular use. Increased use by heavy construction equipment and added car trips during construction would likely exacerbate existing conditions on this road. Applicant should repair any damage construction of the project would accrue to the Bliss Grade and old Highway 30 to the Malad Bridge. Should reservoir encroachment on the toe of the landslide cause slippage of the grade, Applicant should reconstruct the grade. Costs for road repair should be estimated, and should be calculated and considered part of the project costs. The fragility of the Bliss Grade foundation make it very likely that added use will significantly impact road conditions.	See revised Section 5.2.1.5. See revised Section 5.2.1.5. The cost of relocating Shoestring Road and maintaining haul roads is included in the project cost estimates. See revised Section 5.2.1.5.
paragraphs 2-3	Landslide sites should be replanted where possible. The post-project reconstruction of Shoestring Road would pass through the Bliss Landslide. Consideration should be given to routing the road around likely slippage sites. Applicant should bear the cost of any future damage to Shoestring Road due to impacts associated with the A.J. Wiley Project. The post-project Shoestring Road should be paved from old Highway 30 to the Dam, and from the Dam to the old King Hill Canal on the south bank. This would aid in reducing dust in the dam recreation areas. Road relocation and construction expenses should be considered part of the project costs, and the road should be maintained for the life of the project by the Applicant.	See revised Section 5.2.1.5. See revised Section 2.1.2.3.
Pg. 4-5	Foundation Conditions and Seepage. Foundation problems and the presence of the ancestral buried canyon in the area of the Proposed Damsite and Bliss Bridge Alternate Damsite have been known since	No response required.

Idaho Power Company's research in the early 1950s (Stearns, 1954). Malde (1981) recently studied the reach in an effort to gain understanding of new stratigraphic evidence (the Application) indicating that a lacustrine clay (Root Lake Clay) formerly interpreted as Bruneau Formation had a different origin. Malde (1981; 1982, in press) described the ontogeny of the Root Lake Clay through sedimentation in the McKinney-impounded lake, and found evidence that the pillow lava filled ancestral canyon formed a drainage conduit for the lake. According to Tappen (Stearns, 1953) approximately 200 cfs still percolates through the old canyon, arising in the bed of the Snake River where the old and new canyons meet in the vicinity of Bancroft Springs. Wiley Dam has profound geological problems, present though distinct at both damsites. The geological problems (Malde, 1981) are inadequately treated by the DEIS, and Applicant has supplied insufficient data to interpret solutions. All of the geological problems should be presented, perhaps in tabular format, with Applicant's proposed solutions, an evaluation of their adequacy, alternative treatments, and cost (including a worst case analysis). Why was this not done? Can this be added in the FEIS?	Staff believes that the geological problems have been adequately addressed as they pertain to the function and purpose of the EIS. See revised Table 4-5. Staff's analysis, including cost considerations, assumed worst-case conditions.
The buried canyon which snakes in and out from under the modern course of the river was the leaky conduit which drained the McKinney Lake and accomodated the entire flow of the Snake River for at least 25,000 years (Malde, 1981). It presently carries at least 200 cfs which rises in the bed of the Snake River where the modern and ancient canyons meet near Bancroft Springs. What must be avoided in the Wiley Project is the construction of a $230 million bridge. The geological information as empirical reality overrides the Applicant's sparse data - which in itself (based on permeability tests in only four drill holes) indicates a subterranean catacomb of mixed permeabilities.	Your opinion has been noted.
All of the issues raised by Malde (1981) must be addressed in the Final EIS. Pages 6 and 7 are attached.	Dr. Malde's issues are among those addressed by Staff.
Applicant conducted long-term permeability tests on only four drill holes (Idaho Power Company, 1981) "to approximate steady state conditions" (although this would not simulate reservoir pressure). The extreme variation in steady state permeability in these holes ranged from 29 to 63 to 117 gallons of water accepted per minute (the inside diameter of the drill holes was 2 inches), suggesting that Applicant may well not have discovered the upper range of long term, steady state permeability.	Staff agrees.
When there is a variation of 75% between three samples (movement was estimated to range between 10^{-6} and 10^{-4} cm/sec) clearly much more data is required to make any statement other than within sample comparisons. What if there were a large section of the buried canyon between two of the holes which is 75% more porous than the highest value recorded?	Staff agrees; more detailed drilling and testing would be required during the design phase. The environmental impact statement is not a design document.
Applicant's hypothesis that a three tiered line of staggered grout holes would eliminate water passage through the buried canyon could instead merely create local diversions, with water just flowing around the grout pillars. Values ranging from 0.07 to 0.15 to 0.25 cfs (in Drill Hole 2A-81 after 70 hours)represent extreme variation in water accepted by a three inch drill hole! If this condition were uniform for a 2100 foot axis to be grouted, one could anticipate significant leakage of perhaps 400 to 1200 cfs - and this could be only the tip of the tunnel! Water squirted from holes in a pipe may not accurately simulate a steady-state condition in any event. On the basis of a sample size of four	Your opinion has been noted. Staff believes a properly constructed multi-line grout curtain would be effective in reducing to a significant degree any water passage.

Excerpt from: Malde, H.E. 1981. Geologic Factors Pertinent to the Proposed
A.J. Wiley Hydroelectric Project, No. 2845, Bliss, Idaho.
U.S. Geological Survey Open File Report 81-569.

1.4 Synopsis of Geologic Problems, or Potential Problems, Raised by the A. J. Wiley Hydroelectric Project

The geologic factors discussed in this report pertain to three general problems: reservoir leakage, foundation conditions, and the hazard of landslides. The existence and magnitude of some aspects of these problems can be demonstrated from features of the geologic deposits and their origin, whereas an assessment of the potential hazard of others depends on acquiring further geologic information about the distributiuon of concealed deposits and on making suitable tests of geologic materials. This difference between recognizable and potential geologic problems can be better appreciated from the following summaries of the problems themselves.

Substantial leakage from the proposed reservoir is predicated on the porosity of pillow lava in the right abutment (Part 4.1) and on the history of the ancestral Snake River (see Deficiency W-3, Appendix A). The presence of the pillow lava as a leaky conduit (Part 4.2), together with leakage through its associated lava dam, accounts for a thick body of lacustrine clay in the area upstream, which accumulated virtually to the full height of the lava dam. The lake in which the clay was deposited could not have overflowed while the clay was accumulating, for overflow necessarily would have initiated downcutting of an outlet and would have prevented buildup of the clay to its observed height. Thus, all the water carried by the river when the clay was being deposited must have been discharged downstream solely by leakage. Because construction of a man-made dam would recreate the former conditions, although at a much smaller scale, the geologic record suggests that leakage from the resulting reservoir would be substantial (Part 4.3). A possible way to overcome this problem, depending on measurements of the hydrologic properties of the pillow lava (Part 4.4) and the results of field tests, might be to install a grout curtain across the full remaining width of pillow lava at the dam site (Part 4.5).

Foundation conditions at the proposed dam are complicated by the existence of several kinds of geologic materials, and by the incomplete knowledge of their response to conditions that would be created by the impoundment. Three of the most significant complications are briefly explained below.

First, the presence of permeable pillow lava at the proposed dam site indicates the need to isolate the earth-fill embankment from excessive seepage (Part 5.1). Water that reaches the embankment could endanger its impermeable core or exceed the designed tailwater hydrostatic conditions within its downstream section (see Deficiences L/N-1 and 2).

Also, the embankment is underlain by a unit of sand that grades upward to silt (bed 4). Substantial seepage through the permeable lower part of bed 4 could cause piping (internal erosion) of the upper part and lead to failure of the overlying earth-fill structure. Seepage might be prevented by installing effective seals at suitable places within the full thickness of the pillow lava, or by removing all pillow lava from the area below the intake and spillway sections.

Second, the original physical properties of Banbury Basalt in the left abutment at the proposed site have been altered by former geologic conditions, perhaps in a way that would make the basalt subject to rapid weathering. The Banbury has proved to be adequate as a foundation for the Bliss Dam a short distance downstream, but an outcrop near the proposed dam disintegrates to clay and sand when exposed to weathering (Part 5.2). Circumstances about this process and procedures to test the engineering properties of the basalt are discussed in the text (see Deficiency L/N-2).

A third complication under much of the proposed dam site is the presence of debris that probably reached its present position by viscous flow (Part 5.3). Because of physical features of the debris, and because specimens from an outcrop of the debris disintegrate in water, its stability under conditions that can be expected under the proposed dam should be determined (see Deficiency L/N-2).

The hazard of landslides pertains chiefly to an active landslide immediately southwest of Bliss, for which the exposed materials consist of bodies of lacustrine clay, sediments of the Glenns Ferry Formation, and blocks from lava flows that form the canyon rim. The landslide occupies half a square mile and extends from river level nearly to the canyon rim 500 feet higher. Submergence of the toe of the landslide by the proposed reservoir would weaken the landslide debris and aggravate the risk of landsliding. This problem is discussed in the text in terms of several degrees of risk: calving of the lower reach of the landslide; failure of the upper reach; and catastrophic displacement of reservoir water by sudden large-scale collapse of the landslide area (Part 6.1). An assessment of these risks depends on subsurface information, on measurements of physical properties, and on other data needed in order to analyze the stability of the area (see Deficiency W-2).

Landslides in the project area are also a possible hazard in reducing the capacity of the proposed reservoir. The report describes three sites of active or potential landslides that could reduce reservoir capacity (Part 6.2).

little more can be discussed, except that clearly Applicant can have no basis for claiming that staggered grout lines will reduce reservoir leakage to "acceptable levels." It should be noted also that although the ancient canyon transmits a discharge into the bed of the Snake River (Stearns, 1953), this does not necessarily mean that all water lost from Wiley Reservoir would end up re-entering the Snake River at the canyon confluence near Bancroft Springs. There could be significant loss to the aquifer along the way. At the least, worst case analysis would require subtracting the maximum cfs dictated by the limited data available from the electric production of both Bliss Dam and Wiley Dam (with the total being detracted from Wiley's ultimate production).

The worst case scenario for Wiley Dam would be that it were to act as a diversion structure, spilling the Snake River back into the buried canyon and that the canyon would accent most or all of this flow, as it did during the life of Root Lake. Head for Wiley Dam (and volume at the least for the Bliss Dam) would be reduced to some level expressing a balance between porosity of the McKinney pillow lava in the canyon, and the rate at which water was funneled out of the raised, modern impoundment.

Foundation problems for the Application damsite were elucidated by Malde (1981), and earlier by A.C. Cloucher (April 2, 1953, in Stearns, 1953). Cloucher noted potential foundation settling problems on the north bank due to the variable, soft, formations underlying the abutement (the "fear of placing (a) large rigid structure...on one artificial and three natural deposits...unequal settling of rigid structure...may cause serious trouble..."). Foundation problems should be resolved by extending the foundation itself to Banbury Basalt. This would eliminate the permeability threat (again, Applicant has depauperate data for permeability beneath the foundation across its entire length) and it would avoid the concern of uneven settling or piping from Bed 4. Were a Teton-like failure to occur, the washout would be around the foundation rather than under it. The material underlying the foundation - especially the McKinney pillow lava - should be entirely excavated and removed, so that the foundation rests upon Banbury Basalt. The bathtub of the old canyon is too poorly characterized to be certain that in damming the top third, then pushing cylinders of grout across the remainder, the upper portion can be relied upon to hold water. There is no acceptable level of water loss from the Snake River, and the Applicant has no data basis upon which to predict with accuracy what leakage quantities would be. The question will remain whether or not they have missed an extremely porous channel within the conduit. The only way we'll know for certain is either through extensive data gathering, or if the Applicant duplicates the bottom of the old McKinney pool and lets the waters flow again into the ancient canyon. Then we will discover if the empirical evidence of geology controverts the cut and paste methodology proposed.

In reference to Applicant's methodology for examining steady-state conditions for the long-term permeability tests, Applicant provides no literature citation describing the method or delineating control values, i.e., what is the flow rate of the system against known criteria - outside the drill hole, or formations with known

The project, if constructed, will incorporate foundation treatment necessary to reduce leakage to a negligable level. The hypothetical worst-case assumption of constructing the project without foundation treatment is not acceptable.

The problem of a pervious foundation is correctable with standard engineering techniques; the project as licensed would be required to maintain negligible leakage throughout the project life.

permeabilities, for example? It is not clear to me that the pipe with holes drilled in it would not in itself retard water flow. Why not use a rigid rabbit wire fencing or some other method which would provide water with an unimpeded flow, yet support the drill hole walls if they slumped? Without a literature citation describing the methodology and providing standards, the layman or non-expert cannot be expected to be able to interpret this kind of test or what the results mean. If this is a method that was devised for the purpose of testing this site, it is inexcusable not to provide a written description of the procedure and standards by which it can be interpreted. Where is this method described?	The methodology and equipment used in pressure testing of drill holes is the accepted practice in the industry. It was not a system devised especially for the site.
From the drill logs, it is evident that drilling mud was used during the permeability tests, yet this was one of the potential errors identified by Malde (1981). Incredibly this crucial reference was not even cited by the Applicant - nor was the standardized, accepted methodology referenced for permeability tests employed. This tends to seriously detract from the creditibility of the Applicant's results. Not only are there too few holes tested to be statistically meaningful (W-1-3), but the accuracy of the data is open to question. Bad data is worse than no data in this matter.	Your opinion has been noted. Drill mud was used during drilling operations, not during permeability testing.
It is not clear why the Applicant did not employ the use of a borehole camera to elucidate, especially the contact zones between stratigraphic components and the subterranean characteristics of the McKinney pillow lava in each hole. This is a technique routinely employed by the Corps of Engineers, and was utilized in their examination of a series of sites in the vicinity of the Dike Project (Army Corps of Engineers, 1977). This study characterized McKinney basalts near Bancroft Springs as follows: "The McKinney Basalt is a recent flow consisting of pillow lavas, frothy glass and pyroclastics, pahoehoe flows, and dense AA flows. There seems to be considerable disagreement over the stratigraphy of the formation, but for engineering purposes the McKinney basalt can be described as a competent, moderately permeable material with interbeds of incompetent, highly permeable glassy pyroclastics" (page A-2). "The McKinney basalt is a dense, hard, competent basalt with interbedded glassy and frothy units. The McKinney crops out in vertical cliffs with aprons of large talus blocks. Due to the interbeds of largely incompetent material, the McKinney is only moderately useful as a foundation. The McKinney is expected to be moderately to highly permeable and will require special treatment to preclude excessive leakage" (page A-3). "The McKinney Basalt is a prominent cliff former on most of the right bank of the reservoir. The maximum reservoir elevation will be at or above the basal contact of the McKinney in much of the reservoir. Since this contact is an erosional inconformity with a demonstrated high permeability, considerable amounts of water can be expected to enter the water table in the McKinney basalt from the reservoir. Since Bancroft Springs is a groundwater discharge point from the McKinney, a careful groundwater study of the McKinney Basalt should be made" (p. A-6).	Borehole cameras are expensive equipment and are generally not used in drill holes in formations that have a tendency to collapse and choke off a hole.
The fear of losing water to the McKinney is directly relevant to the present project. To the non-expert, the presence of springs arising from McKinney pillow lava along the Wiley Reach and the fact that when farmers irrigate their fields above exposed McKinney pillow lava outcrops	Your opinion has been noted.

the water percolates out from the exposed facies suggests that this is an extremely porous formation. The 200 cfs which arises in the bed of the Snake River at the confluence of the ancient and modern canyons near Bancroft Springs (and Bancroft Springs) indicates also that the McKinney transmits water.	
The Corps study (1977) of the Dike Reach area found that McKinney tended to have seriously porous inconformities where contact zones, especially with Glenns Ferry Formation, occur. This should be carefully examined at the Wiley Reach sites, especially since McKinney occurs above and abuts the Older Alluvium, a formation Applicant has identified as sensitive to weathering effects. If piping began to occur at the contact zone under reservoir pressure, the consequences could be serious. Properly conducted permeability tests and borehole photography of the contact could aid in understanding this problem. Dam safety would promote a worst case situation requiring seating the foundation upon Banbury Basalt and the removal of all of the McKinney and Older Alluvium beneath the foundation. It would also dictate a complete grout barrier for the Older Alluvium as far as it extends into the buried canyon and interfaces with McKinney.	Your opinion has been noted. Your opinion has been noted.
The Applicant does not cite either the data or the study conducted by the Corps (1977).	No response required.
In Figure 3-14, displaying a preliminary geologic cross section of the Bliss Bridge damsite, the Older Alluvium grades into a sandstone in the right abutment. Sandstone formations in this area (Army Corps of Engineers, 1977) have been found to have high permeabilities. If this sandstone is permeable, as was found in the Corps study of the Bancroft Springs area a few miles downriver, water could be lost into the formation from the overlying McKinney pillow lava. If the contact zone is not clean, this could become a water carrying lense (see the Corps, 1977, for further discussion). What is the permeability of the sandstone?	Your opinion has been noted.
In the steady state permeability tests, what was the diameter of the holes in the 2" inside diameter pipe, and how many holes were there per foot? If the area of the holes is known, surface area for the experiment can be obtained (rather than use the inside diameter of the pipe or the inside diameter of the drill hole) and permeability extrapolated. What was the capacity of the pump, and what is the non-linear relationship between pipe length (number of holes) and volume? Finally a standardized table is needed as a control expressing this relationship at foot intervals under control conditions (such as uncontained). To the non-expert this data seems virtually meaningless without controls and standardized information for comparison. Is water squirted from holes in a pipe a valid comparison with steady state reservoir conditions?	This would be included in the studies required for the design of the project. The permeability tests were run using equipment and methods that are standard throughout the industry. The results are technical in nature, but understandable to design engineers and geologists. The data, along with further test results, would be used in the design of a seepage cutoff. The environmental impact statement is not intended to be a design document.
Applicant contends that although the core samples of the Older Alluvium tested for weathering proved vulnerable, "however, the disintegration of the small core samples which have large surface areas are not representative of the response of in situ material" (Idaho Power Company, 1981, p. 3-5). "A more meaningful example of the materials response to local climatic conditions is the condition of actual outcrops of the material that have been exposed to the atmosphere for a long period of time." Independent opinion is needed to determine which of Applicant's	Your opinion has been noted.

	solutions would be most prudent in handling this problem (see also Malde, 1981)., i.e., either not uncovering the Older Alluvium until the last possible to avoid weathering impacts, or applying an asphalt sealant to preserve the integrity of the exposed surfaces.	
	Clearly, Banbury Basalt cannot be utilized for rip-rap material (as acknowledged by the Applicant in Idaho Power Company, 1981, pg. 3-5). What does Applicant propose to use in its place? Similar questions need to be resolved regarding the Older Alluvium and its rapid weathering characteristics.	These questions are properly resolved in the final design documents, not the environmental impact statement.
	W.L. Wells had concerns regarding the use of Root Lake Clay as fill for an earth fill structure: "It is thought that the Root Lake Clay should be used for this purpose (core material) only as a last resort, since it will be very difficult to handle, moisten and compact" (May 7, 1953 report of Idaho Power Company). How does Applicant propose to resolve this question, since some of its borrow areas include Root Lake Clay? Other problems identified in early studies were slippage potential of the dam on the clay zones underlying the foundation and sealing off of the broken rock stratum beneath the Banbury Basalt.	Borrow areas have not been finalized, and additional studies would be required. These studies are in the domain of the design documents, not of the environmental impact statement.
		No response required.
	It is important for the Final EIS to clearly address all of the identified geological problems the proposed solutions, their adequacy and their costs, since this is one of the key issues defining whether this dam is cost-effective or feasible.	Staff believes that the geological problems have been adequately addressed as they pertain to the function and purpose of the environmental impact statement. Staff's independent analysis has determined that a safe project is feasible. Staff's cost considerations reflect the assumed mitigation of worst-case conditions.
4-12; para. 2	Low dissolved oxygen levels could be a problem regardless of which of the two sites were developed.	See revised Section 4.1.4.1.
	The bulk of the sedimentation produced by the construction of Wiley Dam would settle in the Bliss Dam impoundment (settleable solids). It would likely impact the fishery and recreation in this impoundment. What mitigation is proposed? As a worst case, how much sedimentation can be projected within the Bliss impoundment and what would the impact be for the fishery and recreation?	Increased deposition of sediments in the Bliss impoundment would be minimized by implementation of erosion control techniques and monitoring program, as recommended by Staff. No mitigation for the unavoidable impact is proposed. Impacts to the relatively poor fishery in the Bliss impoundment are expected to be minor.
4.1.4.2.	As a mitigative measure to assure adequate dissolved oxygen levels for salmonids, a minimum of 6 mg/l DO should be maintained entering Wiley Reservoir from Lower Salmon Falls Dam and exiting from Wiley Dam. Similarly, instream flow should be designated for Wiley Reservoir to avoid water quality and thermal problems associated with reduced flow-through during low flow. These issues should be incorporated into the FERC license.	See revised Section 4.1.4.1. Your opinion has been noted. See revised Sections 5.2.1.3 and 5.2.1.4.
	Mitigation should be designed for Bliss Reservoir which would be profoundly influenced by this project, both during and after construction phases. A fishery must be established in Bliss impoundment, since the Wiley Project directly affects the site by blocking spawning habitat.	Section 4.1.4.2 contains the mitigation proposed by the Applicant. Staff believes establishing a fishery in the Bliss impoundment as mitigation for the proposed A.J. Wiley Project is unwarranted.
Pg. 4-16	This should also be done for the Bliss Reservoir. Mitigation for the Project should include establishing a resident fishery for the Bliss Reservoir, since Wiley Dam would block all trout spawning habitat for this five mile pool. Put and take stocking should be designed and continued if a permanent, naturally reproducing fishery cannot be	

	established. The cost for this should be calculated into the Wiley budget, and a worst case situation (inability of this barren impoundment to develop a gamefish fishery, thus requiring permanent put and take stocking for the life of the project) should be figured into cost estimates for Wiley Dam. Section 4(h) of the Northwest Power Planning and Conservation Act mandates equal considerations of resident fish and wildlife resources with other project benefits (in this case, hydroelectric power).	The cost of unanticipated mitigative measures would be covered by the 15 percent contingency assumed in the cost estimate. Staff's recommended mitigation in Section 5.2 reflects equal consideration of fish and wildlife resources with other project benefits.
Pg. 4-16, 4.1.6.1., para. 1	Successional relationships will change in the terrestrial vegetation not inundated, and new communities will result.	Your comment has been noted.
Pg. 4-18, para. 2	The riparian corridor has been a refuge for wildlife in the area, in effect a de facto mitigative sanctuary in the midst of twenty miles of developed (impounded) river, and there will not be sufficient habitat in the surrounding valley to accomodate the displaced populations. As these animals leave the area seeking adequate habitat there will be a crash in species abundance and species diversity.	See revised Sections 4.1.6.1 and 4.1.6.3.
paragraph 3	0.1% (Boccard, 1980)	Staff disagrees. The figure of 0.1 percent is used by Boccard (1980) to describe part of the riparian community the Wiley Stretch supports, e.g., the water birch and hackberry segments. The figure of 0.6 percent here is used to indicate all of the riparian-wetland community present in this stretch. The paragraph following the one referred to in the DEIS details the importance of the loss of the woody riparian vegetation. Your opinion has been noted.
paragraph 3-4	This site has a remarkable terrestrial ecology, with a high native species component in the plant communities (72% of the species are native), and hackberry and birch stands that are some of the largest in the state. This is the last of a habitat category that once occurred in other adjacent areas of the Snake River which are now impounded. The structure and function of the riparian vegetation has been fundamental in maintaining passerine bird species diversity, and also in maintaining a diverse mammalian fauna.	
Pg. 4-20 4.1.6.2.	Mitigative Measures Proposed. I have attached a detailed discussion of potential mitigative measures for the project, but the real goal of re-planting an area should be to reproduce the structure and function of the riparian ecosystem. This concept cannot be locked into an acre by acre equivalent, but should seek to maintain the species diversity and wildlife that inhabited the former riparian corridor. Mitigation should begin as soon as the project is approved. Staff suggestions are valuable in this regard.	Staff agrees that a goal of the vegetation mitigative plan should be to reproduce the structure and function of the riparian vegetation as closely as possible.
	As you are probably aware, the National Research Council has completed Supporting Paper 8, "Energy and the Fate of Ecosystems" in their Study of Nuclear and Alternative Energy Systems sequence. In their summary of Major Findings statement they make the following comments regarding additional damming of residuals: "Damming of rivers for hydropower does more damage to ecosystems than any other presently discussed source of energy. Only one type of habitat is in imminent danger of being eradicated in the United States by energy-related activities — free-flowing, wild rivers. Our few remaining scenic and free-flowing rivers or stretches of rivers should be preserved." (See page 386 summary statement 2). They continue in the Policy Recommendations section (pages 388-389): "Should development of new hydroelectric sources cease, continue	No response required.

	approximately at present pace, or accelerate?	
	The loss of the few remaining scenic and free-flowing rivers or stretches of river represents an enormous ecological price to pay for more power. Free-flowing rivers are a priceless, nonrenewable, and rapidly disappearing resource in the United States and in the whole world. So-called multiple benefit river projects lead to multiple conflicts and hidden costs, with water supply, power, recreation, and flood control actually often in competition with one another after completion of a hydro project. Dammed rivers can provide a more consistent, year-round supply of water, but from the ecological viewpoint it would be preferable to turn to any one of the number of other measures before damming rivers. These measures include more vigorous water conservation, preservation of forested watersheds to preserve natural water regulatory mechanisms, more efficient irrigation practices, location of water-consuming activities in regions of the country where the water is currently available, and land-use practices that will not force future generations into heavy reliance on increased irrigation for agriculture. Flood protection and ecosystem protection can often be accomplished by the use of smaller check dams on tributaries of rivers. People should be discouraged from moving into floodplains. Recreational opportunities for wild river recreation, on the contrary, are rapidly disappearing. We strongly recommend that the remaining free-flowing rivers in the United States be left unimpeded, whether by large or small dams."	No response required.
4.1.6.3.	Unavoidable Adverse Impacts. These losses represent nearly all of the woody riparian vegetation in this area of the valley. There will not be anywhere for displaced populations to re-establish with adequate habitat. The valley along the Wiley Reach will be an agricultural area with little wildlife habitat and few species.	Your opinion has been noted.
Pg. 4-24, 4.1.7.1.	Although the Wiley Reach does not have a resident bald eagle population, it does serve as winter habitat. This species was seen on the Wiley Reach last spring (Bowler, 1981). Consideration should be given to planting bald eagles in Malad Gorge or some other local site, such as Box Canyon, if it is protected as part of the mitigation plan as staff recommends (for details on introduction see FERC Project No. 2761).	Your opinion has been noted.
Pg. 4-25	The proposed project would eliminate a very significant portion of the specialized habitat required by the Snake River Physa Snail, a candidate endangered species. This species has only been found alive in the Wiley Reach, which is the type locality. It is not certain that this species will survive if the project is installed. This rare endemic mollusc has been eliminated elsewhere in its modern distribution, and I have made mitigation suggestions (attached) which are experimental, but should be tried.	See revised Sections 3.1.5, 4.1.7, and 5.2.1.4.
	The Bliss Rapids Snail, another candidate species (see Federal Register 45(80): 27723) should be included in all discussions of the candidate endangered/threatened species in the Wiley Reach. This species, like the Snake River Physa Snail, is threatened in all of its known distribution, and it occurs at sites throughout the Wiley Reach. Experimental mitigation measures are attached, and should be finalized and implemented. A third candidate endangered/threatened mollusc is the limpet-like	

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	snail *Fisherola nuttalli*. The loss of the Wiley Reach would further reduce suitable habitat for this species in the upper area of its distribution in the Snake River. If all of the proposed projects saw completion, all three of these molluscs would probably not have sufficient habitat for survival in the Snake River.	
	The Wiley Reach is an island of habitat critical to maintaining a suite of species once characteristic of the upper Middle Snake River. If it is developed there can be no mitigation for the loss of the community composition and special micro-habitat conditions that endemic species require. This is the largest remaining undeveloped segment of contiguous habitat, and anything less cannot realistically be relied upon to support natural community interrelationships in this kind of a big river setting. I propose a comprehensive mitigation plan, but there would be an inevitable loss of species composition in mitigation communities. Due to historic piecemeal development of the Snake River these species have become boxed into remnant habitat refugia. Wiley is the best left of its kind and is irreplaceable in terms of duplicating micro-habitat opportunity for endemic species and native community assemblages. Vigorous mitigation can be done to replace specific components, but there will not be this kind of site in which to reproduce the same communities.	Your opinion has been noted.
	Specific mitigation recommendations for the endangered species are attached.	
4.1.8.1.	Snake River Expeditions, a whitewater raft company, would be terminated. Snake River Pottery, a popular riverside business and sight-seeing location, would be eliminated.	See revised Section 4.1.11.
	This free-flowing river segment has high scenic value of a type that is now very limited. The destruction of this free-flowing habitat will be a great loss to local communities - both now and in the future; a point which is not addressed in this document. Similarly, heritage aspects are not mentioned. There is no discussion of the degradation of emotional health of the surrounding area faced with the loss of unique natural resources. There is no discussion of economic losses to recreation opportunity. The commercial values, both direct and indirect, of rafting are not mentioned.	Your opinion has been noted. No response required. See revised Section 4.1.11.1.
	The document should reflect a consideration of econmic, social, and environmental characteristics of the affected area both with and without the project. One of the most serious flaws in the Applicant's recreation plan is the omission of any substantial discussion of mitigation for the loss of the river segment's present use which would be destroyed by the project. There is no suggestion of mitigation in-kind for the loss of the best whitewater rafting in southern Idaho. Some sort of off-site mitigation should be provided, other than flat-water recreation. Idaho Power Company attempts to abdicate its responsibility for in-kind mitigation of free-flowing river recreation.	Staff believes that the EIS does reflect these areas in Sections 3.1 and 4.1. Your opinion has been noted. Your opinion has been noted.
4.1.8.1.	Paragraph 2 of 4.1.8.1. indicates that motorboat use would not be allowed to avoid conflicts with wildlife mitigation, and that the primary recreational use of the reservoir would be hunting and fishing. If	See revised Section 4.1.8.1. A horsepower restriction or speed limit for boats has been proposed that would restrict speed boating and water skiing, but would allow for fishing and hunting from motorized boats.

	hunting is to be a primary recreational use of this area, a vigorous upland game and upland game habitat effort should be designed since waterfowl retrieval on the reservoir would be limited to nonmotorized boats or dogs. Limited launching access for non-motorized boats would tend to restrict waterfowl hunting.	
4-25	The recognized national heritage values, because of which the Wiley Reach was found to qualify for inclusion in the National Rivers Inventory and which made it a potential National Natural Landmark, would be eliminated. The values of these resources to our culture are significant, and have been mandated for recognition by Congress through the authorizing legislation. Brief descriptions of the values are included later in this review.	Your opinion has been noted.
4.1.8.2.	The recreational potential of Wiley impoundment should in no way be considered an equivalent mitigating factor to the free-flowing recreation opportunity afforded by Wiley Reach. The general low recreation potential to be provided by this impoundment would be both quantitatively and qualitatively inferior to that provided by existing conditions.	Your opinion has been noted.
4.1.8.3.	The elimination of whitewater recreation at this site would leave a population base of ca. 164,000 (see Table 3-8) with the nearest comparable whitewater sites available 150 miles away, which have a shorter use season, more crowded rafting conditions, and which present a very different visual setting and environment (montane vegetation of the Sawtooth Mountains).	Staff agrees.
4-29, para 2	The Shoestring Road should be paved.	[illegible] Section 2.1.2.3.
4-31, 4.1.10.2.	In previously submitted comments I have mentioned additional sites which should be evaluated. This could be done during excavation of the sites eligible for the National Register.	Your opinion has been noted and previously addressed.
4.1.11.1, para 2	Sentence three should be amended to read, "Beneficial aspects of the project in addition to increased short-term employment opportunities would be a gain in electrical power, if it is economically priced." Post-construction operation of the dam would require one to two Idaho Power Company employees, since the dam would be operated by remote control. There would be long-term net employment loss by the construction of the project, since Snake River Expeditions and other businesses would be terminated.	See revised Section 4.1.11.
paragraph 3	Natural heritage losses would occur since resources identified through the National Natural Landmark Program and (Wild and Scenic Rivers Act) National Rivers Inventory would be sacrificed.	These resources are adequately covered elsewhere in the EIS.
paragraph 4	Costs associated with relocation and re-establishment of homes and businesses should be borne entirely by the Applicant. Idaho Power Company has shown a great lack of humaneness in its handling of this issue. One resident who designed and constructed his home (which appeared on none of the Application figures of the project area) was not informed that it would be inundated. Until the publication of the Draft E.I.S. he was not aware that his is one of the four (not three, as suggested by the Applicant in the Application) residences	See revised Sections 4.1.11 and 5.2.1.8.

	that would be sacrificed. Applicant's proposed purchase price of $2,470/acre (Idaho Power Company, 1981) reflects neither fair market values for riverfront - whitewater facing property nor the spirit of making displaced families whole again after the project is completed. Eminent domain does little for the souls of people whose lives have been based around a lifestyle that centers on appreciation of a natural setting.	Final settlement price is determined by state law.
Pg. 4-33, para 4	The thermal alternative would not be dependent upon the water year or streamflow conditions, and would thus eliminate or buffer potential layoffs due to interruptable power use. In another sense, the subsidy enjoyed by interruptible power users includes the possibility of the power end-use priority being switched to different users, thus resulting in layoffs.	Your opinion has been noted.
Pg. 4-35	Geology and Soils. As is discussed elsewhere in these comments, all of the McKinney Pillow Lava should be removed from beneath the dam foundation to assure seepage shutoff. In essence the dam must not only block the present canyon but must also encompass the ancestral canyon. The geological history of this site shows that the ancestral canyon was a functional drainage conduit for the McKinney-impounded lake, that it presently conducts at least 200 cfs, and that there is strong potential of very substantial leakage. The only way to be sure about solving the permeability problem is to seal off both the present and the ancestral canyon. Staggered holes filled with impermeable material may not resolve this situation, and certainly the foundation must rest upon a uniform, impermeable substrate. The foundation should extend to the underlying Banbury Basalts, and the cost of constructing the project should reflect this design. Why is this design not presented?	Your opinion has been noted.
4.1.2.1.,para 2	The Shoestring Road must pass through this area, and any damage that occurs to it should be rectified by the Applicant for the life of the project.	Your opinion has been noted.
4-36, 4.2.2.1.,	paragraph 2. If Applicant channelizes the Snake River from the Bliss Bridge to the Bliss Reservoir, the riparian vegetation on the island might not survive. Geese would be unlikely to nest immediately below the dam, and human activity would likely disturb nesting activity in any case. Since Applicant has not detailed channelization plans, it's not even clear if an island would exist. The BLM wildlife management area would be impacted by the presence of the dam and the increase in human activity.	See revised Section 1.3.1.1.
4.2.3.1.	Site 10GG1 should receive the same salvage excavation procedures that it would under the Applicant's proposed site plans. A site eligible for listing in the National Register is too valuable to leave to chance missing by construction activities. Construction activities are very apt to impact this site, and recovery of the resource should be carried out before the construction commences.	Staff believes that it may be possible to avoid and protect site 10GG1 from impacts during the construction and operation of the Bliss Bridge alternative. Staff intends to request information from the Appliant on the feasibility of a management plan to protect and preserve the site if this alternative is recommended for construction. If such a plan is not feasible, Staff would request the Applicant to file a plan to recover the significant information at the site that could be impacted by the project. See revised Section 5.2.2.2.
4.3	Why is Bliss the hypothetical site of the coal-fired steam electric project? Applicant has partial ownership in three generating facilities in Nevada and proposed two new units of 250 MW each to come on line as early as 1989. It is not clear why Bliss was chosen as the hypothetical	Staff assumed that the coal-fired steam plant alternative, like the proposed project, should be located more centrally within the Idaho Power Company service area so that the benefits, including tax revenues and increased employment opportunities, would accrue where the project costs would be borne.

setting since ownership is apt to be shared by a non-Idaho service area company. Please explain why Nevada, a likely site for future facilities, was not considered.

Table 4-5 The average, maximum and minimum case values for the Bliss Bridge Site do not reflect the loss in head, as compared with the 79 feet of fall anticipated at the Application Site. All values on page 4-54 must be recalculated to accomodate this loss for Alternative 1. If the gradient in the 4000 feet river segment between the two sites is equivalent with the average gradient over the rest of the Reach, i.e. ca. 9.5 ft. per mile, then the difference would be 7.2 feet. Applicant suggests that the difference is 4 feet (Idaho Power Company, Oct., 1981; but also see Idaho Power Company, 1978, Figure C-5). A difference in head of 7.2 feet (subtracted from the 79 feet at the Application site) would reduce project benefits by 9.1%, while a loss of 4 feet in fall would eliminate 5.06% from the electricity generated.

See revised Section 1.3.1.1.

	Average Case	Maximum (1972)	Minimum (1935)
7.2 foot reduction	441.23 Gwh	576.58 Gwh	323.06 Gwh
4 foot reduction	460.84 Gwh	602.2 Gwh	337.4 Gwh

If Applicant's proposal to channelize the 4000 foot reach between the two sites is feasible (Idaho Power Company, October, 1981), then Applicant predicts it could recover two feet of the fall. The cost of channelization should be included in project costs for Alternative 1 if it is to be accepted as an option, and the values described above could be modified. Fall differential should be resolved by independent measurements, and the values cited above on page 4-54 corrected.

Staff estimates of project costs are greater than those of the Applicant, i.e., 55% higher at the Application Site ($233.530 million) and 58% at the Bliss Bridge Site ($213.910 million). It was interesting to note Applicant utilized January, 1980 dollars in its cost estimations (Idaho Power Company, October 1981), although the document was not filed until October, 1981. The Application site does not break even with a coal fired alternative (Table 1-12), and Bliss Bridge Site is extremely marginal at 1:1.08, or $17.1 million dollars from a unity relationship. An itemized listing of project costs should be presented, since Applicant's estimates were unreasonably low and many questions regarding costs remain unclear (new mitigation cost estimates, channelization costs, costs for geological solutions, and so forth). In cases where accurate estimation cannot be made, then worst case analysis, as mandated by CEQ and NEPA, must be considered for the costs. It seems probable that if this project is delayed in coming on line for even a year at FERC's estimated project cost, then it will not break even with a coal-fired alternative.

The benefit-cost ratio referred to is the first year-ratio, not the ratio for the project over the license period. The project benefit-cost ratio is not marginal. See revised Section 1.3.5.

The cost estimate used by Staff includes costs under worst-case assumption and is conservative. See revised Section 1.3.5 and Exhibit W of Application.

If the proposed project or Bliss Bridge were delayed 1 year, the cost of the coal plant alternative would escalate also. The benefit-cost ratio of the proposed project is not marginal.

4-55 Water Resources: Uses and Flows. Three installed private plants would be inundated and head would be reduced at several other small hydro sites. In addition to portions of Malad River and Lower White Springs, segments of three other major spring tributaries and many smaller springs and seeps (Covington, 1982, in preparation) would be inundated in part

See revised Table 4-5.

or in entirety.

4-55	Tributary Drainages. In addition to Malad River and Lower White Springs, segments of three other major tributaries and numerous smaller springs would be inundated.	
4-56	Spawning habitat in tributaries besides Lower White Springs and Malad River would be impacted. Essentially all available spawning habitat in Stoddard Spring (ca. 300 feet) and Steale Spring (ca. 300 feet) would be sacrificed, and approximately 400 feet of habitat in Sullivan Springs would be eliminated (see Fig. 3-6). (Actual field measurements could more accurately give record of these estimates. It should be noted that spawning probably occurs in a number of springs arising near river level, as well (see Covington, 1982, in prep. for recent mapping of Wiley Reach springs.)	See revised Table 4-5.
4-56	Candidate Threatened or Endangered Species. There would also be a reduction in populations of the Bliss Rapids Snails and Fisherola nuttalli. It should be recognized that Wiley Reach is the only site where the Snake River Physa Snail has been found living, and is very important habitat for it. The species has not been verified alive elsewhere, and the Bliss Rapids Snail occurs throughout this reach, but in only one area of the Snake River aside from Wiley. The habitat lost would be serious for the Snake River Physa Snail, especially since it is a very rare species with extraordinarily low population numbers.	See revised Sections 3.1.5, 4.1.7, and 5.2.1.4.
4.57	Vegetation. If the Snake River below the Bliss Bridge is channelized under Alternative 1, then additional riparian vegetation would be impacted, and this added acreage should be calculated and included here. What would that acreage comprise?	See revised Section 1.3.1.1.
4-58	The three plant species are Astragalus purshii var. ophiogenes, Astragalus atratus var. inseptus and Erigeron latus. They should be named in this description. Applicant (Idaho Power Company, Exhibit 1, August, 1980, p. 17) also cites Mentzelia torreyi Gray, Ivesia baileyi Wats., Astragalus calycosus Torr., and A. atratus var. owyheensis as plant taxa of special concern which may be affected by construction, operation, or maintenance of the proposed Wiley project.	See revised Table 4-5.
	Wildlife Habitat. If channelization is incorporated in Alternative 1, then wildlife habitat acreage should be adjusted to include riparian losses below the Bliss Bridge Site.	See revised Section 1.3.1.1.
4.59	Socioeconomic. It would be useful to include the post-project labor force of 1-2 Idaho Power Employees as a separate listing for the two damsites (list this as a separate category).	See revised Table 4-5.
4.60	Cultural Resources. Site 10GG1 should be regarded as impacted. If the channelization attempt is made, this site the only access to the key channelization area (the rapids adjacent the island). Although there may be a more appropriate category in which to mention them, the values for which the Wiley Reach was found to qualify for the National Rivers Inventory and National Natural Landmark consideration should be recognized as being lost with the two damsite alternatives. Since these include cultural and heritage components, they might be mentioned	See revised Section 1.3.1.1. The values that might engender the Wiley Reach with potential for listing in the Nationwide Rivers Inventory, or as a National Natural Landmark, are the values which are considered as part of the environmental impact statement process. These values are considered throughout the document and need not be duplicated at every opportunity.

under Cultural Resources.

4-63 The National Park Service has included the A. J. Wiley Reach in the Phase II finalists of the National Rivers Inventory, authorized by section 5(d) of the Wild and Scenic Rivers Act. This site is described as follows in the National Rivers Inventory final draft:

River Name: Snake River
Physiographic Section: 20d
County(s): Gooding, Twin Falls
Congressional District: 2
Segment Reach Description: From Lower Salmon Falls Dam downstream to the head of Bliss Reservoir
Length (miles): 9
Outstandingly Remarkable Values: Recreation, Geologic, Wildlife, Historic, other
Narrative Description of Values: Mid-section of 1,000+ mile river; highest volume in northwest after Columbia River. Broad, deep fixed channel cut through flood basalts. Contains three USFWS candidate threatened and endangered aquatic species: Snake River Physa Snail, Bliss Rapids Snail, and Shoshone sculpin. Critical habitat and type location for both snails. Riparian zone contains several threatened plant species. Outstanding waterfowl habitat; identified in USFWS Unique Ecosystems Study. Regionally significant "big river" fishing and whitewater boating opportunities.

No response required.

4-7 If the project is regarded as permanent and not limited to the 50 year life of the project timeline, on-going mitigation expenses should be regarded as permanent indentures of Applicant funding as well. Relicensing of the project should continue to use initial (the present conditions at the time of Application approval) standards in which to require additional or mitigation effort upgrading.

No response required.

5-2 Snake River Expeditions would be eliminated.

See Section 5.1.1.1.

Pg. 4-62 4.6.2. National Natural Landmark Program. This is an accurate description of the National Natural Landmark Program. The narrative of the National Landmark Brief for the Wiley Reach of the Snake River describes the qualifying values of this site.

No response required.

Natural Landmark Brief

Description:

The A.J. Wiley Reach, a 12.9 km (8 mile) free-flowing segment of the Snake River between Lower Salmon Dam and the Bliss Dam impoundment, forms the boundary between Gooding (north bank) and Twin Falls (south bank) Counties near the town of Bliss in south-central Idaho. The Wiley Reach has been designated the sixth ranked site in Idaho under the U.S. Fish and Wildlife Service's "Unique Wildlife Ecosystems Program," and is described in the inventory of Important Fish and Wildlife Habitats of Idaho. This site is the best example remaining of the Snake River as a natural habitat in the interior extension of the Columbia River faunal area of influence in the Snake River system, as well as being the best example of the river in the Snake Rivery Plain aquifer (Thousand Springs) region. It has significant elements of rarity, endemism, and endangered situations, including plant, fish and molluscan species. It contains the best fast-water habitats in the Snake River Plain with a remarkable invertebrate fauna, including a unique assemblage of molluscs. The molluscan fauna reflects the geologic history of the Snake River Plain with a remarkable invertebrate fauna, including a unique assemblage of molluscs. The molluscan fauna reflects the geologic history of the Snake River and southern Idaho, and includes relict species from Plfocene and Pleistocene lakes, "big river" species restricted to the Snake River that entered the river system at different times, and widespread elements. There is an undescribed monotypic genus (Hydrobiidae) and another undescribed species (Physidae) restricted to fast-water habitats occurring as endemics at this site. Similarly, the other invertebrate fauna is accurately representative of the native Snake River ecology, and the length of the reach and diversity of habitats allow the native community interrelationships to persist. The aquatic ecosystem has national significance. The Wiley Reach also demonstrates the relationship between the Thousand Springs microhabitats and the Snake River. In addition to the best remnant fast-water habitats in the Snake River Plain, the Reach has outstanding groves of hackberry (*Celtis reticulata*) and other specialised riparian formations (such as extensive water birch, *Betula occidentalis* associations). The hackberry stands are composed of individuals larger than species descriptions predict and are probably the most extensive stands in the state. The deciduous riparian woodland formations, with several other riparian communities or zones, are significant at this site and are comprised principally of native species. Riparian woodland represents less than 0.1% of Idaho's habitats, and deciduous riparian woodland much less than that; none of this habitat type is protected in the state. Another specialized micro-habitat well displayed on the Wiley Reach are gravel terraces and alluvial detritus sites to which certain species are restricted. *Astragalus purshii* var. *ophiogenes*, a species on a federal endangered "watch list," occurs at more than a dozen of these localities along the reach with well established populations. This species is otherwise known from less than two dozen localities, many of which are threatened.

The geology and canyon morphology of the Wiley Reach are an exhibit of the history of the Snake River in southern Idaho. The Wiley Reach dramatically displays the dynamic interplay between the Snake River, Pliocene and Pleistocene lakes, and volcanic shifting of the course of the river. The dynamics of the relationship between the present course of the Snake River and ancestral courses, including a Pleistocene lake formed by the McKinney Butte lava flows and a buried canyon adjacent the modern canyon, are well illustrated in the Wiley Reach. The site provides an excellent view of the mixture of geologies characteristic of this portion of the Snake River Plain. The process of volcanic canyon filling, damming, lacustrine sedimentation, and subsequent downcutting is easily visualized through the geology of the Wiley Reach. This site has significance in the Landforms of the Present Theme in a number of subthemes. In the Works of Volcanism Subtheme, volcanic flows or action which can be viewed along the Wiley Reach include Banbury Basalt (Middle Pliocene), Madson Basalt, Malad Member

No response required.

of the Thousand Springs Basalt, Thousand Springs Basalt, Shoestring Road lava flow, Clover Creek lava flow, McKinney Basalt, Sand Springs Basalt, and McKinney pillow lava (some of these lie outside the actual landmark boundary). Within the Sculpture of the Land Subtheme, ancient embayments formed from temporary lava damming of the Snake River, entrenchment in soft, porous, volcanic material (McKinney pillow lava), and natural landsliding of lacustrine clays and alluvial deposits are evident along the reach. In the River Systems and Lakes Subtheme, the Wiley Reach displays evidence of a buried ancient canyon of the Snake River, Bonneville Flood originated Melon Gravel, various alluvial deposits, lacustrine clay deposited in a lake formed by McKinney pillow lava damming the Snake River (Root Lake) and many illustrations of varying corridor morphology in the Snake River canyon. Under the Caves and Springs Subtheme the Wiley Reach shows Thousand Springs tributaries dissecting the alluvial terrace above the inner canyon corridor (approximately seven tributaries) and demonstrates the porosity of pillow lava and the passage of water through the lava flows of the Snake River Plain.

One of the most dramatic volcanic influences on the course of the Snake River and the topography of the Wiley Reach area of the Snake River was the eruption of McKinney Butte, 14.5 km (9 miles) northeast of Bliss. McKinney Basalt, a series of lava flows of porphyritic plagioclase-olivine basalt, forms the dominant skyline on the east bank for most of the Wiley Reach. When McKinney Basalt was vented, it filled the ancestral Wood River canyon, following its course to the confluence with the Snake River near Bancroft Springs. The displaced Wood River changed its course to skirt the McKinney flows, crossing a tongue of Wendell Grade Basalt and deeply entrenching the modern Malad Canyon in the Thousand Springs Basalt, exposing the Malad Springs in the process. In addition to filling the Wood River canyon, the McKinney flow capped the Madson Basalt on the eastern rim of the Snake River canyon, and filled an old canyon of the Snake River which had been entrenched in Banbury Basalt. The channel of the Snake River canyon was filled to a depth of up to 30.5 meters (100 feet), and the river was forced out of the old bed to the south. Dramatic evidence of canyon filling is seen in the McKinney pillow lava deposits along the Reach, and at one point a small pillow lava dam formed an embayment where a tongue of pillow lava extended across the modern canyon. A steep-walled entrenchment through the pillow lava was made where the river eroded through it. The landform sculpture of the embayment is obvious, and it is easy to visualize the whole process. The McKinney flows dammed the Snake River west of Bliss, forming a dam of pillow lava which produced Root Lake reaching a surface elevation of 969.3 meters (3,180 feet) and nearly topping the McKinney basalt rimrock. Root Lake filled a Snake River canyon much like the modern canyon. Root Lake survived for many thousands of years (at least 25,000 years according to Malde's estimate), depositing a laminated lacustrine clay (Root Lake Clay). This clay is deposited at many sites along the Wiley Reach. Remarkably, the pillow lava dam impounding Root Lake is inferred to have been extremely porous, so that the entire flow of the Snake River percolated through the dam until it finally became impeded by clay and overtopped. Subsequent erosion and scouring by the Bonneville Flood removed much of the Root Lake Clay exposing the canyon beneath it. Today

No response required.

the ancient, filled canyon of the Snake River is situated adjacent the modern canyon with isolated patches of Banbury Basalt and pillow lava facies tracing its course on the north bank of the Snake River.

This remarkable story is superbly portrayed by the geology of the Wiley Reach, and it is easy to see the dynamics of the entire process of canyon filling, the deposition of lacustrine clays, and subsequent downcutting through McKinney pillow lava from excellent examples of these phenomena along the reach.

The Wiley Reach is considered prime white sturgeon habitat, and the Shoshone sculpin (*Cottus greenei*) (a candidate endangered species undergoing status review and classified as "threatened" by the American Fisheries Society) occurs in the tributaries and in the river along the Reach. Both are state species of special concern. Other species of concern which occur on the site are bobcat, prairie falcon, river otter, and osprey. Sensitive species in the U.S. Fish and Wildlife Service's "Unique Wildlife Ecosystems Program" screening criteria which occur in the Wiley Reach habitats include the white pelican, snowy egret, black-crowned night heron, ferruginous hawk, Caspian tern, and burrowing owl. The Wiley Reach is a migration pass-through area for bald eagles and receives limited use by wintering bald eagles; the most recent sighting was in June, 1981. At least one pair of golden eagles nests along the Reach. In addition to *Astragalus purshii* var. *ophiogenes*, four other rare, threatened or endangered plant species occur along the reach. The species diversity and composition of the reach is unusual because of the unique biological and geological features of the site.

No response required.

Significance

The Wiley Reach is the best example remaining of the Snake River as a natural habitat in the interior extension of the Columbia River faunal area of influence in the Snake River system, as well as the best example of the river in the Snake River Plain Aquifer (Thousand Springs) region. It has significant elements of rarity, endemism, and endangered situations, including plant, fish and molluscan species. It contains the best fast-water habitats in the Snake River Plain with a remarkable invertebrate fauna, including a unique assemblage of molluscs. The molluscan fauna reflects the geologic history of the Snake River and southern Idaho, and is composed of relict species from Pliocene and Pleistocene lakes, "big river" species restricted to the Snake River that entered the Snake River at different times, and wide-spread elements. There is an undescribed monotypic genus (Hydrobiidae) and another undescribed species (Physidae) restricted to fast-water habitats occurring as endemics at this site (their type locality). These endemics are candidate endangered species presently undergoing status review. This area of the Snake River is the only river west of the continental divide with a living localized endemic mollusk genus. The other invertebrate fauna is accurately representative of the native Snake River ecology, and the length of the Reach and diversity of habitats allows the native community interrelationships to persist. This Snake River segment is the best example remaining within the Columbia Plateau of a natural large river setting with this type of native invertebrate assemblage and with its unique aquatic ecosystem largely intact. The Thousand Springs tributaries

	along the Reach demonstrate the relationship between a large river and a specialized aquifer-fed spring ecosystem, and is the best example of this within the Columbia Plateau and Snake River Plain. The aquatic ecosystem has national significance. In addition to the best fast-water habitats in the Snake River Plain, the Reach has outstanding groves of hackberry (Celtis reticulata), water birch (Betula occidentalis) and other specialized riparian formations. The hackberry stands are composed of individuals larger than species descriptions predict and are probably the most extensive stands in the state. The deciduous riparian woodland formations, with several other communities or zones, are significant at this site and are comprised principally of native species. Another specialized micro-habitat well displayed on the Wiley Reach is gravel terraces and alluvial detritus sites to which certain species are restricted, such as Astragalus purshii var. ophiogenes, a species on a federal endangered "watch list." The naturally channeled streambed is relatively undisturbed, and the geology and sculpture of the land are dramatic. The rapids and canyon are aesthetically magnificent and compliment the Malad Canyon and other visual resources in the area. The geology and canyon morphology are an exhibit of the history of the Snake River in southern Idaho. The Wiley Reach dramatically displays the dynamic interplay between the Snake River, Pliocene and Pleistocene lakes, and volcanic shifting of the course of the river. The dynamics of the relationship between the present course of the Snake River and ancestral course, including a Pleistocene lake formed by the McKinney Butte lava flows and a buried canyon adjacent the modern canyon are well illustrated in the Wiley Reach. The site provides an excellent view of the mixture of geologies characteristic of this portion of the Snake River Plain. The processes of volcanic canyon filling, damming of the Snake River, lacustrine sedimentation, and subsequent downcutting are easily visualized through the geology of the Wiley Reach. Natural landsliding and evidence of the Bonneville Flood are also present.	No response required.
4.6.3	National Rivers Inventory. The National Rivers Inventory was authorized under section 5(d) of the Wild and Scenic Rivers Act. The Wiley Reach was found to qualify for inclusion in the final Inventory, and this river segment is now eligible for consideration and study for possible inclusion in the National Wild and Scenic River System. Applicant should fund a National Park Service Wild and Scenic River of this qualifying reach prior to further consideration of this project.	Staff believes that NPS would be unable to perform a Wild and Scenic Rivers study of the Wiley Reach without specific Congressional action.
4.8.2.	The relationship between short-term and long-term productivity should reflect the loss in head between the two damsites.	
Section 5 5.1.1.1.	Staff Conclusions This section gives a good summary description of many of the resources and values which would be sacrificed. (9) Development of other small hydro sites along the Reach would be limited to elevations above reservoir level. This summary section should cite significant habitat and population losses for the Snake River Physa Snail and Bliss Rapids Snail. Other candidate endangered or threatened species which would suffer habitat and population reductions are the Shoshone sculpin, found in eight	See revised Sections 5.1.1.1 and 5.1.1.2.

	tributaries which would be inundated, and a number of candidate plant species, the most important of which is Astragalus purshii var. ophiogenes. Fisherola nuttalli, a candidate threatened or endangered limpet-like snail would lose further Snake River habitat. A nationally significant molluscan species assemblage would be eliminated from this eight mile reach. Staff can review my previous comments in selecting any addition impacts they consider significant. The aesthetic loss of an eight mile reach of free-flowing river should be included.	See revised Sections 5.1.1.1 and 5.1.1.2.
5.1.1.2.	The potential exists for loss of water from the Snake River due to the existence of an ancient canyon filled with permeable material which raised water level from the reservoir would fill.	No response required.
5.1.2. 5.1.2.1.	Bliss Bridge Site (1) As discussed above, if channelization to gain head is undertaken, riparian vegetation may not persist. Geese would not nest immediately below the dam, and it is not clear whether channelization would be done around both sides of the island (it may not be an island). (3) Applicant has supplied insufficient data to support the contention that permeability problems are not formidible at this site. The potential exists for loss of water from the Snake River due to the existence of an ancient canyon filled with permeable material which the raised water level from the reservoir would fill. Hydroelectric power production would be reduced at this site as compared with the Application site because of the difference in fall.	See revised Section 1.3.1.1. The project cost estimate used in revised Section 1.3.5 included foundation treatment necessary to reduce seepage to a neglible level.
5.2	Mitigative Measures. The goal of mitigation for riparian vegetation losses should be to match the structural and functional relationships of the natural habitat. Species diversity in any mitigative community will be different from the natural communities in a site like the Wiley Reach, but every effort should be made to duplicate the structure of the habitat. This is critical for the maintenance of wildlife species diversity.	See revised Section 5.2.1.1. Staff agrees.
	In general the mitigation proposed by the Staff and the agencies should be implemented, yet there are many other strategies which are feasible that should be employed. I have designed some specific mitigation measures which extend the liklihood of success for ameloriating specific environmental losses.	No response required.
	Applicant's proposed mitigation plan is inadequate, and comprises 0.1% of project expenses, or $164,000 of project costs originally estimated at $128.55 million (Application Site) and $124.25 million (Bliss Bridge Alternative Site). No parity was shown between fish and wildlife considerations and other project benefits, as mandated by the FWCA and Section 4(h) of the Pacific Northwest Electric Power Planning and Conservation Act. It is unclear what FERC Staff and agency proposals would cost, but strong language in these laws makes cost no legal issue. Cost estimates should be made, however, since any cost overrun would place the project in a fractional benefit/cost relationship compared with the thermal alternative.	Your opinion has been noted.

5.2.1.1. **Vegetation**

(1) The deciduous woody riparian woodland of the Wiley Reach is structurally unique and mitigation plantings should attempt to replicate the natural structural aspect of the riparian community. This should be done both on-site and off-site, with a goal of reproducing the habitat's function in maintaining wildlife species diversity. This may mean that replacement will have to be considered at a much greater than acre for acre ratio; if the goal is properly interpreted and met, acreage restrictions should be secondary. In the South Fork American River, Upper Mountain Project FEIS, for example, (FERC, Final EIS, Project No. 2761), the Applicant proposed replacement of specialized riparian habitat at a 2:1 acreage ratio.

(2) Re-establishment of hackberry, river birch and squawbrush should be a goal, as these are three key deciduous components of the structure of the of habitat. Where possible immature stock from the Wiley Reach could be transplanted if nursery stock is difficult to obtain.

(3) Applicant mentions potential diurnal water fluctuation levels of up to five feet, with rare maintenance drawdown of up to ten feet. Fluctuation regimes of five feet per day during any time of the year is unacceptable and would seriously jeopardize riparian habitat re-establishment, as well as impact forage organisms for fish in the littoral zone. FERC should carefully review habitat mitigation designs with the potential of five feet of daily cycling in mind, and if this would interfere with mitigation success, then a limit should be placed upon allowed fluctuation. This should be written into the license. Even fluctuations of three feet per day are damaging to littoral organisms (see Irving and Cuplin, 1956).

(4) This should be implemented and the agency suggestions of drilling trickle wells should be utilized at adjacent reservoirs as well.

(5) I concur.

(6) This would be a minimal requirement, since it may become evident that even more replacement acreage is needed to reach goals of maintaining wildlife species diversity and habitat adequacy for establishing resident populations. Post project monitoring may delineate additional mitigation needs which cannot be predicted through an acreage limited agreement.

Your opinion has been noted. See revised Sections 4.1.4.1, 4.1.5.1, and 5.2.1.3.

Staff recommendations:

(1) This is an excellent proposal, but it should not be limited to the project boundaries. For example, Applicant submitted acreage maps for vegetation categories as supplemental information, yet no mapping was done outside of the project boundary so that the significance of the acreage to the valley was unknown. It is difficult to understand the significance of the riparian habitat if it is presented as existing in a vacuum. Mapping should have been done to include at least the 2800 ft. elevation plateau. The surrounding habitat should be taken into account in the shaping of the mitigation strategy for the project. It may be that mitigation sites along streams could be purchased and developed which would enhance efforts within the project boundary. For both the Applicant's supplemental mapping and additional surveys, the figures presenting acreage maps of the vegetation should be keyed to clear, summer photographs of the entire reach, so that the reviewer could compare accurate photographs with the vegetation depicted in the maps. (The errors in the supplemental maps are immediately apparent using this method.)

Your opinion has been noted. The recommendations are proposed to clarify discrepancies in the vegetation maps and to determine the exact number of acres of vegetation types to be impacted. Staff does not agree that such an extensive survey need be conducted outside of the project boundary. A general mapping of the surrounding area could be undertaken and any offsite area for riparian vegetation mitigation determined. It is Staff's preference to have all mitigation on-site if at all possible.

	(2) This is an invaluable suggestion and it should be accurately implemented.	No response required.
	(3) Rather than limit replacement at a one to one acreage ratio, I would seek structural and functional goals that could require much greater effort yet would have a better chance of achieving ecosystem based objectives.	Staff agrees that the main objective of the vegetation mitigative plan should be to reproduce the diversity and structure of the community and to provide quality habitat that will support a wildlife diversity similar to the existing one. If the plantings are not successful as envisioned, it may take a greater acreage replacement than 1.25:1 to support a diversity of wildlife that is close to the present diversity.
	(4) The island concept is inappropriate, and I concur with the agencies and staff that a closer duplication of the continuous habitat approach be mandated. Permanent irrigation could be a necessity.	Staff agrees.
	(5) A pilot program should be initiated upon licensing.	Staff agrees.
	(6) As an Intervenor I request the opportunity to participate in this process.	No response required.
	(7) This valuable recommendation would help preserve the genetic representation of the Wiley Reach populations and would be using stock which would likely have a better chance of transplanting in similar soils.	No response required.
	(8) A license limitation should be considered to restrict diurnal fluctuation, which could profoundly influence mitigation success. This would reduce the peak load value of the project, but this would be a project cost that should be assumed to give fish and wildlife parity with other project benefits (electricity) under the FWCA and section 4(h) of the Regional Power Act. Loss of peaking ability should be discussed as a decrease in project benefits, and the potential generation reduction noted in the appropriate tables and discussions.	Your opinion has been noted.
5.1.1.2	Upland game habitat and populations should be surveyed and a mitigation strategy devised. This is especially important since winter hunting will likely at least equally focus on upland game as upon waterfowl since motorboat use will be restricted.	Your opinion has been noted.
5-8.	Paragraph 1. As I discuss in my comments on 4.1.6.2., the National Research Council (1981) stated, "Damming of rivers for hydropower does more damage to ecosystems than any other presently discussed source of energy. Only one type of habitat is in imminent danger of being eradicated in the United States by energy-related activities - free-flowing, wild rivers." The Wiley Reach is the last substantial remnant of the habitat type it represents, and is important otherwise as the best whitewater recreational site in its region.	No response required.
	Paragraph 2. Sentence one is an excellent statement of the parity of values in replacement. Pre- and post-project HEP studies should be carried out to be a quantitative means of evaluating mitigation success. Applicant should fund this interagency evaluation, and cost should be part of the project expense. What would such a study be as a project expenditure?	A habitat evaluation technique would help quantify habitat value. No response required.
	I concur with (1) - (10). Upland gamebird habitat is central to the success of gamebird residence, and habitat replacement efforts should begin immediately after project licensing with the hope of retaining resident birds, rather than displacing them. A goal-oriented population base should be designed, and pheasants should be stocked to bring the population up to that level and the population level should be maintained.	Your opinion has been noted.

5.2.1.3.	**Fisheries** In general I am in agreement with (1) - (3), however, I recommend Applicant enhance and maintain either a put and take or resident fishery in free-flowing recreation sites in the Hagerman Valley to mitigate some of the sport fishing river opportunity. For example, Malad River is a nearby site which Applicant could stock, and there are many other sites within the Thousand Springs that could be enhanced. Not only Box Canyon, but a site where the Wiley Reach genotypes of the Shoshone sculpin can be perpetuated should be preserved. A number of other specific mitigation measures for the Shoshone sculpin and other candidate threatened or endangered species including restocking of the historic range are discussed in my mitigation recommendations. Indefinate put and take stocking efforts for the Wiley reservoir should be considered part of the project, and the cost included for the life of the project.	Staff does not believe that additional stocking of hatchery fish in other areas of the Snake River in the Hagerman Valley or in tributaries such as the Malad River is warranted. See revised Section 5.2.1.4. No response required.
5.2.1.4.	**Water Quality.** A dissolved oxygen minimum of 6 mg/l should be maintained for Lower Salmon Falls Dam water entering Wiley reservoir and for water exiting from Wiley Dam. An instream flow requirement should be designed for the reservoir.	See revised Section 5.2.1.3.
5.2.1.5	**Geology** I have discussed the geology elsewhere, but Applicant has provided insufficient data upon which to base final design or evaluate the extent of mitigation measures required. In this case, worst case analysis is required as mandated by NEPA and CEQ, which would require the extension of the dam foundations to Banbury Basalt and the removal of all McKinney pillow lava and Older Alluvium from beneath the foundation. Other problems are discussed earlier in these comments. Applicant's proposals are not legally adequate, nor can this Draft EIS meet legal requirements until much more data is presented.	Staff believes that the geologic information filed by the Applicant is adequate to determine the mitigative measures required to construct and operate a safe project. The data are also sufficient to develop relevant cost estimates and to determine the benefit-cost ratios of the project, assuming a worst-case analysis; Staff has put forth its proposals in revised Section 2.1.9.2. Revised Section 1.3.5 reflects the cost estimate to construct and operate a safe project assuming the worst-case conditions. Staff recognizes that additional future studies would be required before a final design is approved by the Independent Board of Consultants normally appointed after a project is licensed, but this would not affect the feasibility of the project.
5.2.1.6	**Recreation** I support the protection of Box Canyon and Malad Canyon, and have provided additional suggestions in my attached comments.	Your opinion has been noted.
5.2.1.7.	**Cultural Resources** Additional sites along the reach have been mentioned in my comments of November 23, 1981, and these should be visited by Applicant's consultants. 10GG1 should be excavated for development of either damsite.	See response to your comments on Sections 3.1.8 and 4.2.3.1.
5.2.2.1.	**Geology** Applicant's preliminary investigation has insufficient data to corroborate this conclusion, as is discussed earlier.	Your opinion has been noted.

	Paragraph 1. Applicant has provided insufficient evidence to ascertain whether the seepage potential both in the buried canyon and under the dam can be resolved by the mitigation proposed by the Applicant for the Bliss Bridge Site. The Bliss Bridge site would have less head than the Application Site, and it is not clear that the geological problems at this site can be constructed at a lesser cost than the Application Site.	Your opinion has been noted.
	Paragraph 2. Until the permeability problems both under the foundation and in the buried canyon are adequately characterized, cost estimates for the Bliss Bridge site cannot be made.	Your opinion has been noted.
	Paragraph 3 should reflect the loss in head at the Bliss Bridge site.	See revised Section 5.4.
5-16.	Paragraph 2. As was elucidated in Section 1, even if all of the potential hydroelectric developments pending - regardless of cost effectiveness, environmental or recreational significance - saw completion, they would not be enough to meet need projections for more than a few years. The hydroelectric resources would be susceptible to their lowest production during adverse flow years, when regional shortfalls would be most likely to occur. Whether or not the Wiley Project sees construction, two coal fired units will be on line by 1992 at the latest. If the coal fired steam plant alternative were employed as opposed to the Wiley Project, it would allow an orderly development of other resources, instead of relatively few megawatts and serve only to meet new need for fractions of years at enormous capitalization cost. This approach forces the Applicant to employ a continual construction capitalization, and at the same time prepare for investment in a thermal plant before most of these little hydro projects see completion. The Applicant is not acting in the ratepayers interest to force a continual capitalization burden during one of the worst money market periods in recent times. A 250 MW thermal project would allow a consolidation and orderly development of hydro residuals beginning with the most environmentally benign and cost effective - rather than beginning with the least cost effective project proposed, the Wiley Project, which is essentially the same price per kwh as coal - yet at great recreational and environmental loss. The Wiley Reach is one of the most significant riverine resources in southern Idaho, which, combined with a lack of cost effectiveness, argues for developing this site last, if ever. The Draft EIS has clearly demonstrated that this project should not be built because of the recreational and environmental significance of the resource, its cost as the most expensive hydro power ever proposed in Idaho, and its lack of meeting need even for a year. The thermal alternative would allow more accurate forecasting and the fruition of conservation, solar, load management and other non-structural alternatives, as well as giving time to interpret the functional MW contribution of small hydro and cogeneration. At the same time, thermal development could allow another unit to be added if all other means still yielded a shortage. Whether the coal plant is built in Idaho or elsewhere (or simply added to Applicant's present coal units in Nevada), Applicant clearly foresees solving the next decade's problems with coal whether we lose resources like Wiley or not.	Your opinion has been noted.

Appendix B Significant Geological Events.

B-2 para. 6, line 2. remnant, not remant

line 4. is generally, not in generally

Interestingly, our new knowledge about the McKinney impounded lake ("Root Lake") now indicates that downcutting forming the Malad Gorge would have occurred after the draining of that lake. Since that lake must have been in place at least 25,000 years (Malde, 1981), this means that the entrenchment of the Malad Canyon must have been a rapid downcutting initiated immediately after draining of the lake, rather than immediately after the McKinney flows.

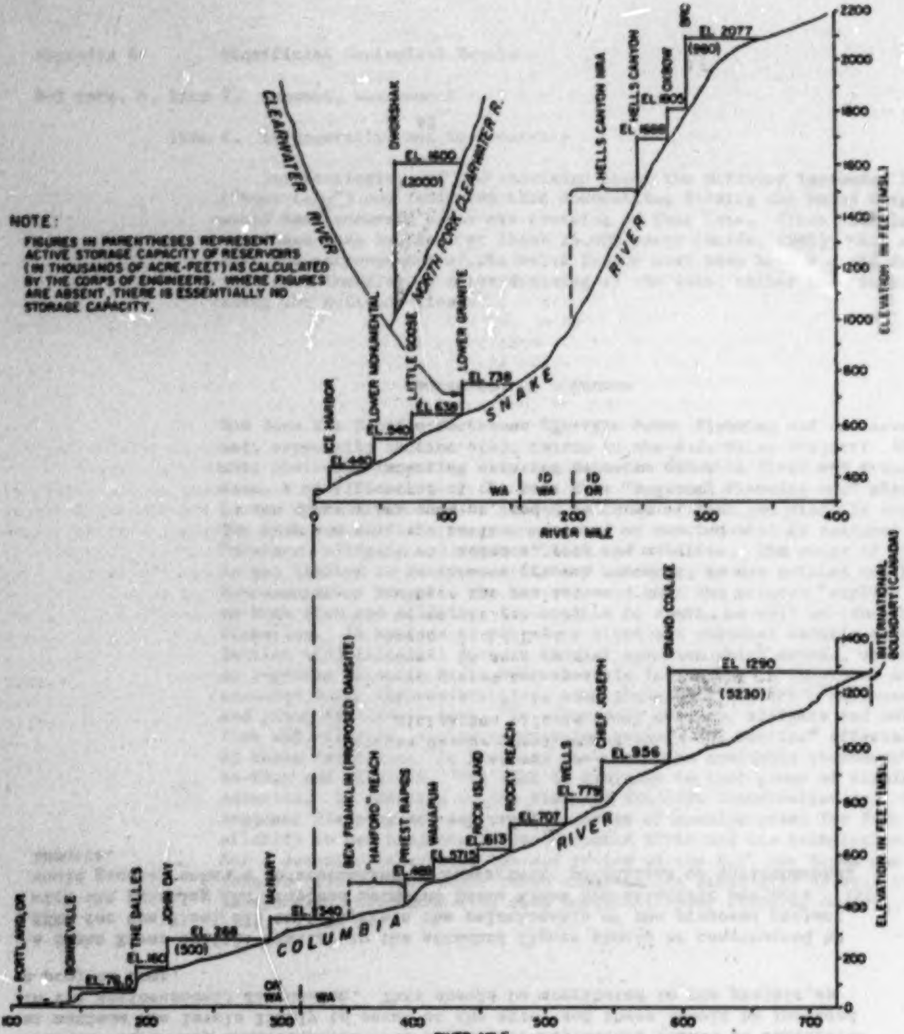
No response required.

Miscellaneous Comments

How does the Pacific Northwest Electric Power Planning and Conservation Act, especially section 4(h), relate to the A.J. Wiley Project? Although most obviously impacting existing mainstem Columbia River and tributary dams, a clarification of the role this "Regional Planning Act" plays in new Snake River dams is needed in terms of fish and wildlife conservation. The fish and wildlife program mandated by section 4(h) is designed to "protect, mitigate and enhance" fish and wildlife. The scope of 4(h) is not limited to anadromous fishery concerns, as was pointed out by Representative Dingell, who has stressed that the program "applies to both fish and wildlife. It applies to sport, as well as commercial fisheries. It applies to migratory birds and resident animals as well." Section 4(h)(11)(A)(i) directs federal agencies which manage, operate, or regulate Columbia Basin hydroelectric facilities to interpret and exercise their responsibilities, consistent with the Act's purposes and other applicable laws, "To adequately protect, mitigate and enhance fish and wildlife, including spawning grounds and habitat" affected by these facilities "in a manner that provides equitable treatment" to fish and wildlife. The FERC is included in that group of regulatory agencies. In addition to the Fish and Wildlife Coordination Act, the Regional Planning Act may provide parity of consideration for fish and wildlife in new projects in the Columbia River and its tributaries. For a detailed interpretation and review of the Act, see Blumm and Johnson (1981), upon which these comments are based with several loosely paraphrased quotations (see also Northwest Power Planning Council, 1981, Volume 1).

The Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. §839(a)-(r), requires, inter alia, that the Commission exercise its responsibilities consistent with the purposes of that Act and provide equitable treatment for fish and wildlife.

Projections of whitewater recreational carrying capacity and worst case (maximum) use potential should be developed. Disparity between user costs to travel to Wiley (from for example, Twin Falls) and the Salmon River should be made and evaluated as a social cost of the project over the life of the project. This cost should be calculated as a project cost, unless Applicant provides alternate transportation for the life of the project (i.e., free weekend bus service for recreational use of the Salmon River area). The economic value of the losses to the whitewater recreation industry and local economic community beneficiaries from whitewater recreators should be calculated at maximum use levels likely to occur at the site, and these should be included in the socioeconomic discussion. This should be attributed to the project as a project cost.	Your opinion has been noted.
A Snake River profile similar to the attached figure should be constructed by FERC for the Final EIS to illustrate the relationship of the proposed project with the existing and proposed mainstem Snake River hydroelectric projects. This would greatly enhance understanding of synergistic potentials of environmental impacts.	See revised Section 4.1.4.1.



NOTE:

FIGURES IN PARENTHESES REPRESENT ACTIVE STORAGE CAPACITY OF RESERVOIRS (IN THOUSANDS OF ACRE-FEET) AS CALCULATED BY THE CORPS OF ENGINEERS. WHERE FIGURES ARE ABSENT, THERE IS ESSENTIALLY NO STORAGE CAPACITY.

Figure 1a. Mainstem dams on the Lower Snake River and Columbia River.

Figure 3

Profile of Columbia and Lower Snake River Projects

From: Washington Department of Ecology, 1980.

Introduction

Mitigation designs must be based upon the context of the project site and the ecological relationship of the project area with the surrounding habitat. This is particularly important for a site like the A.J. Wiley Reach since it lies between two impoundments and its ecology has become a focus for aquatic and terrestrial communities which have been eliminated elsewhere in the Hagerman Valley. To understand the values of native riparian habitat it is important to recognize such factors as species diversity, the limitedness of similar situations, unique ecosystem aspects of the site as a residual undeveloped habitat, other aspects such as rare, threatened or endangered species present, and the significance of the site to indiginous and migratory avian species. Recreational, scenic, heritage, and cultural resources must similarly be interpreted not only within the project boundaries, but within the local and regional area of use. For example, in terms of white-water recreation, a site like the Wiley Reach is extremely significant to southern Idaho if for no other reason than because of limitedness of the resource in the southern region of the state.

In developing an understanding of the context, it is pertinent to review the historic development and the scope of proposed developments. It is critical to understand synergistic impacts upon all resources - both from existing projects and because of the sheer magnitude of new proposals. When seen in this light, mitigation efforts must be particularly vigorous since success or failure of focused resource mitigation will determine fundamental ecosystem and recreation or human-use issues in a more lasting sense. To develop the Wiley Reach means the loss of a significant component of the Hagerman Valley riverine and terrestrial ecosystem, and to mitigate this loss requires not just on-site efforts, but must now face the reality of synergistic implications from the other projects for which there was no mitigation (in the modern sense used here). Without native riparian habitat surviving in a lengthy, intact reach, mitigation must now be undertaken at Wiley Impoundment, Lower Salmon Impoundment, and Bliss Impoundment to keep the area from becoming depauperate in game, species diversity, and recreational opportunity. Similarly, we have reached a point in the development of the Valley at which crucial decisions must be made regarding heritage and scenic resource allocations. The Thousand Springs, Bell Rapids, Upper and Lower Salmon Falls, portions of Malad River, and the Bliss Dam Reach have all seen development for hydroelectric generation alone. Nearly all of the rest of the Snake River which remains in a free-flowing state has been filed upon for power development-Auger Rapids (private), Clear Lakes (IWRB and the Corps), Kanaka Rapids (IPCo), Dike Reach including the Shoestring Rapids (IPCo) and Wiley Reach (IPCo). Chinook salmon and steelhead have been blocked from their historic spawning habitat in the Hagerman Valley, Critical habitat for a number of species and restricted community types are included in these areas - encompassing, for example, the white sturgeon (a gamefish) and several candidate endangered species.

No response required.

In this context, then, Idaho Power Company, which has been the primary historic developer of the Snake River, must now do comprehensive mitigation throughout the Magic Valley's Thousand Spring-Snake River ecosystem. IDFG and USFWS are to be commended for recommending offsite mitigation such as drilling trickle wells along Lower Salmon Falls and the Bliss Impoundments to increase woody riparian along these barren impoundments. I have listed a number of possible mitigation strategies which are holistic in that they are not restricted to on-site efforts and are concerned not only with specific target species, but are aimed at the ecosystem as a whole - probably the only way to truly attempt to offset synergistic problems.	No response required.
In summary, when the early projects in the Hagerman Valley were constructed, the undeveloped residuals with their native riparian and riverine habitats acted as refuges or unintended, de facto mitigative sanctuaries. Now that these remnants - especially the Wiley Reach - are proposed for development, mitigation must be done throughout the Valley. While the undeveloped residuals remained, they offset or moderated synergistic impacts in the impoundment sequence and focused use of the free-flowing resource into the best of all mitigative worlds - an adjacent undeveloped reach of the same river. Offsite mitigation in the early developments was not as critical as it is today. By opting for complete development the developers must now carry out the mitigation that was never done on the early projects. The development of any new site on the Snake River must face this issue.	Your opinion has been noted.
The measures for mitigation suggested here are feasible, and represent a range of possibilities, although there may be others which could be designed. Some would be economically attractive to Idaho Power Company while others require an undetermined expenditure, both in terms of economic and other resources.	No response required.
As the DEIS states, "The Applicant's goal should be to replace habitat value losses with similar habitat of equal value" (page 5-8). Obviously this unique habitat cannot be duplicated, thus because of its uniqueness and the ecological focus it has become, a comprehensive habitat replacement effort should be made which truly attempts to give the resources at this site the parity they have been mandated with the project benefit (electricity). Rather than an acre for acre approach, the structural components of the habitat should be the aim of replacement efforts. This aspect of the mitigation plan can best be designed when better information is available. The door for future design modifications should be left open. This should be a creative challenge that will be ongoing for the life of the project. A continuing pre- and post project Habitat Evaluation Procedure study should be made to gain better knowledge of the habitat quality mitigation must meet. The HEP studies should be funded by the Applicant. The values determined will be useful in gauging the success of mitigation programs, so that it can be better judged when similar "habitat quality" (although not unique ecosystem aspects) has been approached by mitigation efforts.	Your opinion has been noted.

Scenic Mitigation Potential

Applicant is in a fortuitous position to undertake mitigation measures in the Magic Valley because of its extensive land and water rights holdings. In the context of this utility's developments, it is in a better position to implement mitigative measures than is any other group, including state and federal agencies.

1. Malad River. The Malad River is a heavily used resource in the Wiley Reach area and is protected in the upper reaches by the Malad Gorge State Park. It has been found to qualify for National Natural Landmark status, and is a significant exhibit of the geology, biology, and hydrology of the Snake River Plain Aquifer and Big Wood River.
   Suggested mitigative measures:
   Applicant should withdraw its two applications for water rights to further develop (commercial aquaculture hatcheries) Malad Canyon and the Malad River (Idaho Department of Water Resources Application Ident. Nos. 37-7774 and 37-7781).
   Additional mitigation for free-flowing recreation could be accomplished by a trout stocking program in the upper impoundment and the reach between the two impoundments, with stocking levels recommended by the Idaho Department of Fish and Game. Applicant could work with IDFG in submitting a minimum streamflow filing for the reach between the two impoundments, and should support the existing filing (by IDFG) on the lowest reach of Malad River.

2. Banbury Springs and Briggs Springs. These sites, especially the former, which is one of the most heavily sites in the area (by the Boy Scouts), are locations upon which Idaho Power Company has filed for the development of commerical aquaculture hatcheries (and hydroelectricity in the former). Applicant could withdraw its development applications and work with IDFG in support of minimum streamflow filings for these sites.

3. Niagra Springs. Niagra Springs is the only designated National Natural Landmark in the Snake River Plain Aquifer system and is a scenic exhibit of the Thousand Springs. Applicant has filed to develop this scenic resource for hydroelectric purposes. This filing could be withdrawn, and Applicant could work with IDFG in developing and supporting minimum streamflow at this site.

4. Thousand Springs. Applicant has an existing hydroelectric facility at this site. Applicant could re-open these springs and forego the electricity produced (see the Department of the Interior comments for the North Fork Payette River Project No. 2930 which suggest viewing power sacrifice for recreational purposes be included in project costs.) This could also be coupled with the utility working with state agencies or conservation groups (such as The Nature Conservancy, for example) in the purchase of the Ritter property.
   As the Department of the Interior stated on the North Fork Project (see North Fork Payette River, Project No. 2930 - Idaho, pages D-1 through D-8): "Costs for mitigation of the loss of free-flowing values, in our view, should be considered separate and in addition to those costs which are necessary to provide full public utilization of the project for recreation purposes as required under the regulations. These costs should be treated as project costs in the same manner that providing fish ladders for mitigation of the effect of a reservoir on related fisheries is a project cost for mitigation. Any calculation of "benefits foregone" for periodic releases of water to restore free-flowing qualities to the river would, under this approach, be

The specific sites and mitigative measures proposed would appear to be appropriate items for discussion during the consultation process envisioned by Staff to extend protection to environmentally significant areas in the vicinity, as partial mitigation for the loss of natural values at the proposed project.

Staff notes that many of these sites are discussed under subsequent subject headings. The extent to which any or all of these sites or management programs might provide a degree of mitigation for the A.J. Wiley Project would be determined when any further mitigative programs are proposed by Applicant.

considered mitigation costs.
Despite water releases and recreation enhancement, much of the river values - both tangible and intangible - will be lost for the foreseeable future. The loss of these river values, in the generic sense, can be mitigated, in part, through assuring that similar values on other rivers are preserved in their best condition. We suggest the Applicant develop a mitigation program to acquire conservation easements along appropriate river reaches and donate such easements to a non-profit conservation organization such as The Nature Conservancy or the American River Conservation Council. AARC has indicated it would be interested in exploring the possibilities of such a program. We would be happy to work with the Applicant to find specific rivers and sites that would be appropriate and to help define a level of commitment in relation to the proposed project" (excerpts from pages D-6 and D-7).

5. Box Canyon. The privately owned portion of Box Canyon could be pruchased and managed by IDFG, IDPR, or a private conservation group. Applicant could work with IDFG or IDPR in supporting a minimum streamflow filing to protect aquatic resources at this site.

Bliss Rapids Snail (Hydrobiidae)

The Bliss Rapids Snail is a candidate endangered species, and the Wiley Reach is critical Snake River habitat for the species, as well as the type locality. This species is known from Box Canyon as well as the mainstem Snake River. I recommend these mitigation measures:

1. Purchase and preservation of Box Canyon, deeding it to IDFG, USFWS, or a private organization such as the Nature Conservancy.
2. Collect living individuals from the Wiley Reach and stock them in the "Cove Creek" tributary of Malad River in the Malad Gorge State Park. Introduce them also to the uppermost springs in the main gorge (well above the upper impoundment).
3. Propagate the species using methods similar to those recommended for the Snake River Physa Snail, then re-introduce the species to likley habitat within its historic range. This should include other large Thousand Springs tributaries such as the Thousand Springs "estuary" segment on the Ritter Property.
4. Transport suitable habitat to transplantation sites. This would involve identifying and moving suitable substrate material, i.e. certain types of smooth basalt boulders from large gravel bars in the Wiley Reach to introduction sites.
5. The Applicant should work closely with IDFG in gaining data for and submitting minimum streamflow at all transplantation sites. Should conflicting filings exist, as perhaps could be the case in Box Canyon, purchase of the conflicting use for mitigation purposes would be part of the acquisition.
6. Carry out a monitoring program for this recovery effort reporting regularly to the USFWS on the status of the species. If these measures fail, new recovery program efforts should be designed and implemented.

Shoshone sculpin (Cottus greenei)

The Shoshone sculpin is a candidate endangered or threatened species. I recommend the following mitigation measures be considered for the loss of at least eight populations along the Wiley Reach:

1. Purchase of Box Canyon, dedicating the site to the USFWS, IDFG, or a private conservation organization such as The Nature Conservancy.
2. Purchase of at least one spring system in the area of the Wiley Reach, and assure its preservation and the preservation of the viable Shoshone sculpins within it. Applicant should work closely with IDFG in gathering data for minimum streamflow filing on both Box Canyon and the Wiley Reach tributary, and should strongly support IDFG in its instream flow filing. If a conflict in beneficial use exists due to prior filings, purchase of the other use would be considered a part of the mitigation cost at the site.
3. Capture enough Wiley Reach area Shoshone sculpin stock to introduce a potentially viable population into the Cove Creek tributary in the Malad Gorge State Park.

See previous response concerning Scenic Mitigative Potential.

These recommendations should be considered in the development of a plan to mitigate project impacts on Shoshone sculpin. See revised Section 5.2.1.4.

Sampling should be carried out on the uppermost springs in the main gorge of the State Park to determine if C. greenei is present; if it is not, stocking should be done at this site. If sufficient numbers of fish can be captured, other areas within hte historic distribution should be similarly stocked. These sites should be areas with presently depressed populations.

4. Consideration should be given to raising Shoshone sculpin in a hatchery, then stocking the historic range.

5. An ongoing status review of this species should be undertaken, reporting the status of existing populations and the success of establishment of the species in sites such as Cove Creek.

Astragalus purshii var. ophiogenes

I recommend the following mitigative measures for this species:

1. Applicant should preserve populations existing on its lands at other locations.	See revised Section 5.2.1.1.
2. Applicant should purchase additional privately owned sites and similarly assure their preservation. This could be done by dedicating the land to The Nature Conservancy or some similar conservation group.	Your opinion has been noted.
3. Applicant should collect as much seed material from Wiley Reach populations as is feasible, and should plant it in good habitat elsewhere within the natural distribution (perhaps, for example, in the dune habitats along the base of the McKinney cliffs adjacent the Bliss impoundment). Some seed should be retained in case these introduction efforts do not succeed. It may be necessary to germinate the species and plant seedlings if seeding does not work.	Staff agrees. See revised Section 5.2.1.1.
4. An ongoing status review group should monitor the species at all sites.	See revised Section 5.2.1.1.
Bald Eagle Although the Wiley Reach is not a major overwintering area, this species does use the site, and has been recorded from the reach as recently as June, 1981 (Bowler, 1981). Recommended mitigation measures include the preservation of Box Canyon and additional conservation efforts in Malad Canyon. Box Canyon, Malad Canyon or some other site (the Snake River Birds of Prey area, for example), could be evaluated for suitability to Bald Eagle introduction. A similar proposal was forwarded by the developer in FERC Project No. 2761, and this reference could serve as a potential template for introduction methodology (submitted in conjunction with California Fish and Game Department). Similar to the Wiley Reach, no nesting bald eagles were found in the project area of 2761; nonetheless, the developer forwarded a design for the introduction of the species to suitable habitat.	Your opinion has been noted.

Snake River Physa Snail

The Wiley Reach comprises critical habitat for the Snake River Phsya Snail, a candidate endangered or threatened species. Other habitat was likely lost through the three existing Applicant impoundments in the Hagerman Valley. I recommend the following mitigation efforts for this species.

1. Collect as many living individuals as is possible and propagate them in:
   (a) An artificial habitat, perhaps submerged in flowing Snake River water, making sure that there was good habitat for egg case deposition and that predators were excluded.
   (b) Using natural, existing habitat (such as an isolated riffle or boulder bar) in the Snake River, propagate the species excluding predators. This system could be isolated naturally by making it an island of habitat (removing any adjacent suitable habitat or creating a habitat barrier that the species would not cross), or by confining it within an artificial enclosure (screen it off).

2. Stock the species in any habitat that looks potentially viable within the historic distribution. This would include experimental introduction to some of the largest Snake River tributaries in the area, such as Malad River, Salmon Falls Creek, and so forth. Dr. D.W. Taylor should be the primary consultant in this effort, and he may have better ideas about potential sites for introduction.

3. Transplant suitable habitat to introduction sites. This would involve identifying and moving suitable substrate material, i.e., certain types of smooth basalt boulders from bars in the Wiley Reach to the introduction locations. This could be critical in successfully establishing this sensitive species which requires very specialized micro-habitat conditions. An on-going status review should be perpetuated, with Dr. D.W. Taylor as the primary consultant.

Your comments have been noted. See revised Section 5.2.1.4.

White Water Recreation

Idaho Power Company should fund a Wild and Scenic River study of the A.J. Wiley Reach, since it was included in the National Rivers Inventory.

Idaho Power Company should purchase conservation and scenic easements on other rivers in southern Idaho and should maintain acceptable access sites for floater put in and take out points with the goal of preserving and making accessible an river segment of equivalent length.

Specific Congressional authorization would be required before a Wild and Scenic River study could be performed. Although the Wiley Reach is one of 21 river segments in Idaho included in the Nationwide Rivers Inventory, no specific proposals have been made to enhance river-oriented recreational opportunities at those or other rivers in Idaho as mitigation for the loss of recreational opportunities that would result from the proposed project.

[illegible]

The whtie sturgeon is a gamefish in Idaho, and was formerly anadromous. Remnant, depauperate populations exist in isolated habitats between mainstem Snake River dams from Shoshone Falls to C.J. Strike Dam, and also in Hells Canyon. I recommend the following mitigative efforts:

1. Using the methodology of Doroshov (1982, in press), propagate white sturgeon from eggs to stockable size. This could be accomplished either with Snake River fish captured from the remaining populations, or by using Columbia River stock. Applicant should either fund the IDFG and USFWS in this effort, or arrange for their supervision of a utility hatchery effort or the purchase of stock from one of Doroshov's graduate students (Dr. Beers), who is establishing a white sturgeon hatchery (private) near Bonneville Dam on the Columbia River.

2. Estimate the number of fish required to bring all of the remaining habitat in the Snake River from Shoshone Falls to C.J. Strike Dam up to viable population levels so that natural reproduction, over time could continue a natural fishery. If this is not found to be feasible in the Snake River system, consideration should be given to similar efforts in some other Idaho river system, such as, perhaps the Kootenai.

3. Stock enough hatchery fish at all sites to bring populations up to viable reproduction levels. It should be emphasized that hatchery enhancement is no way intended to be a substitute for natural reproduction. It is simply a way of getting fish back into good habitat.

4. Catch the Wiley population and introduce them to some other sites where adequate habitat occurs.

5. Evaluate the possibility of designing and constructing a spawning habitat for remnant populations with poor spawning opportunity.

6. Design and implement a continuing monitoring program which would carry out permanent study of these populations so that the goal of viability through natural reproduction could be evaluated.

These recommendations should be considered in the development of a plan to mitigate project impacts on white sturgeon. See revised Section 5.2.1.4.

Upland Gamebird Mitigation Program

An upland gamebird mitigation program should be designed, with a goal of establishing 50 reproducing pairs of pheasant along the Wiley Reach. Suitable habitat would also have to established. Quail would likely not need to be enhanced; chukar similarly would probably not be substantially affected. Hungarian partridge could be impacted, and the IDFG could evaluate the need for population enhancement as a result of reservoir caused habitat changes.

Your opinion has been noted.

Dissolved Oxygen

Dissolved oxygen requirements below Lower Salmon Falls Dam and Wiley Dam should be written into the FERC license with 6 ppm D.O. as a minimal level.

See revised Section 5.2.1.3.

Instream Flow	
Instream flows should be established for all Applicant water projects on the Snake River in the Magic Valley to avoid synergistic problems associated with greatly reduced flow-through times in the impoundments should instream flow be reduced. This should be specified for Lower Salmon Falls and Wiley Dams in the license for the Wiley Project. Instream flow protection should prohibit moving the King Hill Canal pump from below Wiley Dam to any site above Wiley Dam, which would reduce generating capacity.	See revised Section 5.2.1.3.
Three Year Turbine Mortality Study	
A three-year mortality study at Wiley Dam should be initiated to better understand stocking needs and response for the Wiley impoundment. Similar study should be conducted at Bliss Dam. Requirement for such an evaluation was mandated at the American Falls Dam in its recent re-licensing.	See revised Section 5.2.1.4.
Fisherola nuttalli	
Fisherola nuttalli is a candidate endangered or threatened species for which the Wiley Reach is an island of habitat near the interior limit for the species in its Snake River distribution. This species has experienced extensive habitat loss through impoundment of the Snake River. I recommend the following mitigation efforts: 1. Collect as many basalt boulders with living Fisherola on them as is feasible and transplant them to a number of large spring tributaries throughout the Thousand Springs region. Malad Canyon (especially near the upper springs), the mouth of Box Canyon, Thousand Springs, Niagra Springs, and Riley Creek are likely introduction sites. Since micro-habitat requirements for this species overlap in part with the Snake River Physa Snail and the Bliss Rapids Snail, some of the mitigation efforts could be designed to serve a number of species. Perhaps other tributaries in other parts of the Snake River should be considered also.	No response required.
Molluscan Community Assemblage	
The molluscan fauna of the Wiley Reach is unique and has national significance. I recommend the following experimental mitigation effort be implemented. 1. Seek sites along major Snake River tributaries, such as Salmon Falls Creek, Rock Creek, and other tributaries where either boulder bars could be artificially established from the Wiley Reach, or where there are basalt boulders similar to those of the mainstem Snake River. Collect large numbers of representative species from the habitat of the Wiley Reach and introduce them in an experimental effort to retain genetic and species representation of the Wiley Reach populations in the general area of their natural distribution (within the historic range). Billingsley Creek and the mouth of the Thousand Springs and Box Canyon could also be sites worth evaluation. All mitigation efforts for mollusks should be based on consultation with Dr. D.W. Taylor. He may have better mitigation concepts than these or may know of other sites with a greater liklihood of success in transplantings.	Your opinion has been noted.

In general I concur with the IDFG/USFWS proposals, however, additional emphasis should be placed upon developing similar and additional efforts on other local impoundments. Consideration should be given to coordinating new mainstem Columbia River tributary mitigation efforts with section 4(h) of the Pacific Northwest Electric Power Planning and Conservation Act mandates. These requirements and considerations could greatly support ecosystem oriented mitigation efforts. For example: There is good record that the Wiley Reach, and the Hagerman Valley up to Auger Rapids, was a productive and heavily harvested chinook salmon and steelhead resource prior to migration blockage by the Applicant. Literature indicates use by Shoshone and Bannock Indians and commercial harvesting by local residents (1890s harvests were approximately eight tons of dressed salmon annually.) Irving and Cuplin (1956) recorded steelhead below C.J. Strike dam in 1952, so that access could have been utilitzed by this species in the Wiley Reach until approximately 1949, when Bliss Dam would have terminated any upriver runs. Indian treaty rights and mitigation for the termination of the salmon and steelhead runs should be considered in view of the Regional Power Act section 4(h) mandates, and a FERC license is the place where new requirements should be recorded. Efforts to re-establish woody riparian habitat at adjacent impoundments should similarly be considered under this legislation. Other mitigation actions such as the establishment of breeding waterfowl population goals, recreational fisheries, and habitat improvement for fish should be evaluated.	No response required.

One of the fundamental issues facing the Commission in License considerations for sites like the Wiley Reach is the concept of the public trust. Black's Law Dictionary defines public interest as "something in which the public, the community, at large has some pecuniary interest, or some interest by which their legal right or liabilities are affected. It does not mean anything so narrow as mere curiousity or as the interests of the particular localities, which may be affected by the matters in question."

The Applicant must demonstrate that the public interest is better served by the public's benefit from the project than the public's beneficial use of the natural resource in its natural, undeveloped state. There has been false presumption excercised by the utility interests that any production of power is per se in the public interest. Modern enlightened legislation such as the Fish and Wildlife Coordination Act, section 4(h) of the Pacific Northwest Electric Power Planning and Conservation Act, and the Wild and Scenic Rivers Act mandate recognition and parity of consideration for non-development public interest values. While the FERC does "not generally administer those (environmental) laws, we (FERC) do have enforcement responsibilities relative to environmental matters as those matters relate to the Federal Power Act." (55 FPC 3048)

Balance of Interests

"The test is whether the project will be in the public interest. And that determination can be made only after an exploration of all issues relevant to the public interest, including future power demand and supply, alternate sources of power, the public interest in preserving reaches of wild rivers and wilderness areas, the preservation of anadromous fish for commercial and recreational purposes, and the protection of wildlife." (387 U.S. 428)

FERC "is charged with the responsiblity to improve and coordinate Federal plans, functions, programs, and resources so that the Nation may, among other things, 'fulfill the responsibility of each generation as trustee of the environment for succeeding generations,' and assure 'for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." (55 FPC 1563)

The essence of the public interest test is whether a project would take away more than it would contribute. Applicant bears the burden of demonstrating that the A.J. Wiley Project has engineering feasibility, is cost effective compared with the full range of alternatives, and that the public will benefit more by its construction than by the public's present and potential uses of the undeveloped natural resource.

Recreation Considerations

"Recreational values are given consideration in every license application before (FERC)...(FERC) realizes that in many cases where unique and most special kinds of recreation are encountered a dollar evaluation is inadequate as the public interest must be considered...Unique and most special kinds of recreation have been preserved in the public interest at the cost of loss of power which is definately ascertainable in monetary value." (12 FPC 206)

"The objective of protecting 'recreational purposes' means more than that the reservoir created by the dam will be the best one possible or practical from a recreational standpoint." (387 U.S. 428)

"Recreational purppses encompass usch matters as the conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites, as well as more conventional public outdoor recreation activity considerations. Such considerations may even be determinative; the Commission has denied requested

No response required.

action on the basis of probable impacts to aesthetic and recreational resources, even where the proposed project was otherwise economically feasible." (55 FPC 1563)

"Unique and most special type recreational streams are, quite frequently, also fine power streams."

"The framers of the Federal Power Act undoubtedly were aware of these conflicting uses when they formulated the statutory guides found in Section 10(a) for the issuance of licenses. Tremendous quantities of falling water - latent electric energy sources - have been and remain unused because their scenic or recreational values have caused them to be placed in a superior position....(For example,) the Great Falls of the Yellowstone River in Yellowstone National Park...and Niagra Falls... must continue to go unharnessed...(And) the consideration of public interest is no less because a unique and special type of recreational resource may have (only) local or regional interest." (12 FPC 207)

No response required.

The DEIS has recognized that the Wiley Reach is the only recreational opportunity of its kind and quality for much of southern Idaho, representing a population base of 164,000 persons. Whitewater recreation is expected to greatly increase in the future, and the Idaho Department of Parks and Recreation estimates a 75% increase by the year 2000. The Idaho Whitewater Association, an Intervenor in this Proceeding, believes that user growth will be far greater than that (Transcript of Hearing, July 28, 1981). Wiley Reach could accomodate whitewater recreation use needs for southern Idaho for the foreseeable future (the DEIS made no estimate of what its carrying capacity might be, but clearly it has great potential for serving the population's river recreation needs for many decades into the future). Without Wiley's opportunity, this population base would have to commute to the Salmon River country, 150 miles removed (see Schmidt, 1980 for a user attitudes survey of the site). Applicant must demonstrate that the public interest value of riverine recreation for this population is worth less than the project benefit from development.

Because of the extraordinary natural attributes of the Wiley Reach, its accessibility to one of the largest population bases in the state, the limitedness of other similar recreational opportunities in the region, and the suitability of the site for a broad diversity of users, this river segment was included in the National Rivers Inventory authorized by section 5(d) of the Wild and Scenic Rivers Act. An interpretation of Congressional intent for the bill which became the Wild and Scenic Rivers Act states, "Streams which are not yet authorized for inclusion in the system but that show particular promise should be given special attention for study either by Federal agencies or by the States...; and during a reasonable study period and for a time thereafter, they should be accorded substantially the same sort of protection against Federal agency action as is accorded those which are included in the (national system)" (House Report No. 1623, page 3804). The Wiley Reach has been identified as showing particular promise for inclusion in the Wild and Scenic Rivers system and should receive treatment as if it were a part of that system until a completed Wild and Scenic Rivers study has been carried out and reviewed. As a part of the National Rivers Inventory, should not this Application be held from proceeding further toward License until the reach has received a Wild and Scenic Rivers study, funded by the Applicant?

Your opinion has been noted.

In the context of this discussion of public interest aspects of this application, the DEIS has recognized that the only benefit accrued by the project is electricity, i.e. 37.5 MW ninety percent of the time, 70.5 MW dependable capacity and 86 MW of capacity listing. This would be more of a peaking facility as opposed to the base-load, coal-fired steam-electric alternative with which it is compared. The Project is expensive, with benefit/cost below unity compared with coal at the Application site

Your opinion has been noted.

and a 1.08:1 relationship at the Bliss Bridge Alternative site, at 82.21 mills/kwh. The engineering feasibility of resolving serious geological problems which require much more work to characterize adequately to meet legal requirements of NEPA, is being challenged by intervenors and agencies. Thus the marginal economic relationship of the project will likely be exacerbated by added costs and delay. Alternative sources of power are not adequately treated, and various intervenors maintain that the production of an equivalent quantity of electricity could be derived from more economically attractive and environmentally benign sources. In the vicinity of the project there are three existing Snake River dams, two more on its major tributary (Malad River), and a total of four other mainstem Snake River dams proposed in the area in addition to Wiley. This site has been identified as a regional, state, and nationally significant remnant of a native habitat type, and it clearly falls with "the public interest in preserving reaches of wild rivers...and the protection of wildlife", as delineated in 387 U.S. 428. The site is a magnificent whitewater recreation area that is listed in the National Rivers Inventory. The Reach has been found to qualify for potential designation under the National Natural Landmarks Program. It supports a unique riparian and aquatic species assemblage that is not represented elsewhere. Included are a number of candidate threatened or endangered species. It is also a stirring aesthetic natural heritage resource. As is stated in 12 FPC 207, other similar resources have been found to serve the public interest better in their undeveloped state than through impoundment, and the merits of this site warrant similar recognition here. If compliance with the Fish and Wildlife Coordination Act and section 4(h) of the Pacific Northwest Electric Power Planning and Conservation Act convey the parity of consideration for fish and wildlife resources they mandate, the Wild and Scenic Rivers Act provides the requirement for study before development of this reach identified as a promising prospect fon designation, the significance of the unique ecosystem aspects of the site are recognized, and the value of this river segment as the major regional whitewater resource is accrued, then surely these and other public interest values outweigh the 0.08 balance of benefits above costs at the alternative site.

There is no question that this project takes away more than it contributes. It is not in the public interest to pursue this costly project for such a nominal, questioned benefit, which in itself can likely be procured more frugally from a coal fired plant, other hydroelectric projects, or independently produced power purchased by the Applicant at avoided cost prices. The balance of public interest is strongly directed toward the preservation of this reach.

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COMMISSION

Route 3, Box 302
Buhl, Idaho 83316

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D.C. 20426
Attention: Kenneth Plumb

Re project #2845, A.J. Wiley Dam

Commissioners:

Please register my strong opposition to the proposed A.J. Wiley Dam near Bliss, Idaho. I live eight miles upstream from the area to be inundated by the proposed reservoir site. This is an important scenic and whitewater recreation area, the value of which exceeds that of the electricity (37.5 megawatts ninety percent of the time) that could be produced there. Project costs do not compare favorably with power made available through aggressive conservation programs. I feel the money to be spent for the project would be invested with more return in the development of energy from alternative sources such as small hydro, solar, and biomass. It is unfair to future generations to dam our free flowing rivers until we have exhausted all other reasonable alternatives for the power we need. In Idaho these alternatives have not been seriously explored, let alone exhausted.

In addition to these general concerns, I would like to draw your attention to the geological problems at the proposed dam sites studied by Dr. H.E. Malde of the U.S. Geological Survey, and to the absence of mitigation plans for whitewater recreation and fish spawning habitat in the DEIS recently issued by your commission. The difficulties imposed by the geology of the dam sites may make the project costs much higher than presently estimated, thereby increasing the cost of the electricity paid by the utility customer. There is some question as to whether the geology of the area has been investigated thoroughly enough to prove the site is suitable at all for construction of a dam. No mitigation is possible for the loss of recreational whitewater, and none is proposed in the DEIS for loss of sturgeon habitat and other fisheries.

I hope you will take these thoughts into consideration in your decision regarding the A.J. Wiley Dam project.

Sincerely,

Randall Morgan

c: Idaho PUC

8205060114

FEDERAL ENERGY REGULATORY COMMISSION
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APR 30 1982
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Your opinion is noted. See revised Section 1.

See revised Sections 1.2.5, 1.3.2.1, and 1.3.2.2.

See revised Section 1.3.5.

See revised Sections 1.3.1.1 and 2.1.9.

See revised Section 5.2.1.4.

Friends of the Snake River
P.O. Box 28, Bliss, Idaho 83314

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TO	INIT.	DATE

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Apr 30 1 15 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

POOR ORIGINAL

Federal Energy Regulatory Commission
825 N Capitol NE
Washington DC 20426
Attn: Kenneth Plumb

Please include this letter in the Final EIS for the A-J Wiley Project (project number 2845).

It is being written to protest construction or authorization of construction of Wiley Dam.

To destroy what remains of the reach of the Snake River under consideration is uncon[illegible] coniable! The loss of a unique and irreplacable span of the river, with the households and farmlands it encompasses, would be a tragedy, one of power over people that should never occur.

Sincerely yours

Mary Stephens Nelson
1221 Pebble Lane
Boise, Idaho 83705

FEDERAL ENERGY REGULATORY COMMISSION
DOCKETED
MAY 3 1982
DOCKET SECTION

8205060121

Your opinion has been noted.

Comments on the Draft Environmental Impact Statement
(FERC/EIS-0031/D) for the A. J. Wiley Hydroelectric
Project No. 2845, Idaho

Harold E. Malde
Harold E. Malde

April 16, 1982

My comments on the statement (DEIS) consist of both general comments on topics under consideration (p. 1-2) and detailed comments on the text (p. 3-15).

GENERAL COMMENTS

Timely Designation of an Independent Advisory Board. Section 5.2.1.5 mentions that design problems for a subsurface cutoff to reduce seepage are typically addressed by a Board of Independent Consultants. After the failure of the Teton Dam, which was constructed without the advice of an independent board, the U.S. Department of the Interior Teton Dam Failure Review Group (1977, p. 107) recommended that "an independent board of review be convened for each major dam project . . . [to] review both design and construction at appropriate intervals." For the proposed Wiley project, designation of an expert review board now would be timely, not only to advise on control of subsurface seepage, but to consider whether enough information about the proposed site is available to determine the feasibility of the project, its safety, and its ultimate cost. Why are these questions, for which the answers are still uncertain, not addressed and evaluated at this time? Answers to such questions could forestall future engineering problems and financial hardships for the applicant, the rate-payers, and the regulatory agencies. Indeed, early answers conceivably could reduce the ultimate cost of a safe and efficient structure.	Staff's independent analysis has determined that a safe project is feasible. A board of Independent Consultants would not be established until a license had been granted by the Commission. Staff has determined that a safe project is feasible and has necessarily assumed mitigation of worst-case conditions. Staff's economic analysis in revised Section 1.3.5 reflects the costs required to remedy geologic problems and to construct and operate a safe project.
Dubious Data on Permeability of the McKinney Pillow Lava. The applicant reports permeability values for the McKinney pillow lava ranging from 1 x 10^{-4} cm/sec to 1 x 10^{-6} cm/sec, together with long-term percolation tests in drill holes ranging from 29 to 117 gallons per minute (International Engineering Company, 1981b, drill hole DH 7-81; 1981c, drill holes DH 2-81, 2A-81, and 4-81). The reported values are dubious for several reasons:	No response required.
1. The testing procedures are not explained, but the drilling logs show that standard methods for field permeability tests in boreholes (Malde, 1981, Appendix C) were not used. In particular, the test holes were drilled with drilling mud. Furthermore, the logs frequently mention lost circulation, and they report poor recovery of the core, collapse of the walls, and related evidence that documents the incoherent nature of the pillow lava.	Your opinion has been noted.
2. The reported permeability values are several orders of magnitude less than values that are typical of basaltic rocks in the region, which include dense lava flows that would be expected to have lower permeability than the McKinney pillow lava (Malde, 1981, p. 37).	Your opinion has been noted.

3. A water well three-quarters of the mile east of Bliss, which is entirely in McKinney Basalt (Malde, 1971, p. 16), has a yield of 80-100 gallons per minute, according to records on file with the U.S. Geological Survey in Boise.	No response required.
4. Stearns (1954) reported that the McKinney pillow lava is permeable, as shown by discharge of ground water at springs, by water loss in drill holes, by flowing water encountered in drill holes, and by percolation tests. He further noted (p. 5) that "Water tests could only be made on the sandy beds during drilling because the coarser debris would not usually stand without casing. Thus the water tests . . . are not representative of the formation as a whole."	No response required.
5. The U.S. Army Corps of Engineers (1977, p. A-2, A-3) described the McKinney Basalt "as a competent, moderately permeable material with interbeds of incompetent, highly permeable glassy pyroclastics . . . Where it occurs in a dam abutment, detailed exploration to determine the type and extent of remedial treatment will be required. * * * Due to the interbeds of largely incompetent material, the McKinney is only moderately useful as a foundation. The McKinney is expected to be moderately to highly permeable and will require special treatment to preclude excessive leakage."	No response required. Staff agrees.
6. Unpublished mapping by H. R. Covington of the U.S. Geological Survey shows several springs in McKinney pillow lava at river level along the right bank upstream from Bliss. During the irrigation season, water is also discharged from the pillow lava at higher levels in the canyon wall.	No response required.
Incomplete Knowledge of the Older Alluvium as a Foundation. The geologic unit that the applicant calls Older Alluvium is a non-indurated deposit of mixed debris, perhaps in part an ancient debris flow, whose distribution and lithologic variability have been poorly explored. The applicant recognizes that samples from the Older Alluvium are "vulnerable to rapid disintegration" (International Engineering Company, 1981b, p. 3-5). Testing of the Older Alluvium as a foundation, however, is incomplete, in the sense that its properties when wet have not been determined (Malde, 1981, p. 44-51) and tests on only a single sample have been reported (International Engineering Company, 1981b, p. 3-3). Furthermore, the degree to which the sample that was tested might be representative of the weaker parts of the Older Alluvium is uncertain because only two-thirds of the drill core was recovered. Finally, the stability analysis of the applicant is based on a horizontal potential failure surface, although a softened zone in the Older Alluvium might have any inclined attitude, given what is known about the internal variability of the deposit. In summary, without adequate knowledge of the distribution, variability, and physical properties of the Older Alluvium under the hydrostatic conditions and loads that would be imposed, the safety of the proposed project cannot be evaluated. See also, comment 7 for Section 4.1.3.1 below.	Your opinion has been noted. Your opinion has been noted. Your opinion has been noted. Your opinion has been noted.

DETAILED COMMENTS

In the following comments, the column at the left refers to sections and paragraphs (Par.) in the DEIS. Excerpts from the DEIS are underlined.

SECTION	COMMENTS	
Summary Par. 6	The Bliss Bridge alternative and the proposed A.J. Wiley Project would cost $12.3 and $9.1 million a year, respectively, less to operate than the coal-fired plant alternative. See comment for Section 1.3.5.	See revised Section 1.3.5.
Summary Par. 6	Preliminary data indicate that the foundation problems at the Wiley Damsite are not prevalent at the Bliss Bridge site. What are the foundation problems at the Wiley damsite? See also, comment for Section 1.3.1.1.	The existing foundation conditions at the proposed site, as they pertain to the EIS, are discussed in Section 3.1.2.
1.3.1.1 Par. 1	Staff . . . believes that the foundation conditions at the [Bliss Bridge] site are more compatible for embankment dam construction. What are the foundation conditions at the Bliss Bridge site? See also, comment for Section 2.2.1, comment for Section 2.2.3, comment 1 for Section 3.2.1, comment 3 for Section 4.2.1.2, and comment 1 for Section 5.2.2.1.	The existing foundation conditions at the Bliss Bridge alternative site, as they pertain to the EIS, are discussed in Section 3.1.2 and 3.2.1.
1.3.1.1 Par. 2	Cross sections . . . in the 1954 report [by H. T. Stearns] indicate that the pillow lava deposit [at the Bliss Bridge site] is located more in the existing channel and less on the abutment wall, and becomes thinner proceeding upstream. The nearest cross section given by Stearns is 4,400 feet downstream, and the end of his longitudinal profile is 1,700 feet downstream. Hence, the quoted statement depends on an extrapolation of the distribution of the pillow lava. What is the basis for this prediction of the location and thickness of the pillow lava? See also, comment 2 for Section 3.2.1 and comment 3 for Section 4.2.1.1.	The basis for the predictions and for Staff's subsequent request for drilling data on the Bliss Bridge site were Stearns' (1954) nearest cross-section of the river, No. 24, which is more correctly only about 2,100 feet downstream, and his longitudinal profile cross-section, No. 25, which extends only to about 1,300 feet downstream of the site. Additional drilling and seismic exploration by the Applicant in the summer of 1981 verified the extrapolation.
1.3.1.2 Par. 2	Staff has evaluated the economics of constructing the project with a lower reservoir elevation . . . and the project would be uneconomical at reservoir elevations below 2,718 feet. See comment for Section 1.3.5.	The economic analysis performed by Staff in revised Section 1.3.5 employed a cost estimate that includes Staff's estimate of the foundation treatment necessary to ensure a safe and adequate project.
1.3.5 Par. 3 Par. 4	The results of the economic studies are shown in Table 1-12. * * * The Bliss Bridge site would have a higher benefit-cost ratio because it would require less grouting to overcome potential problems posed by the pillow lava. The results of the economic studies and the cost-benefit analyses are given only as unsupported statements. Hence, a non-expert reader is denied the opportunity to evaluate the conclusions. Why are these studies and analyses not explained? One must assume that the present estimate is based on the general design submitted by the applicant. Hence, to the degree that the design represents the least costly method of construction, the estimate correspondingly represents the	

	lowest predicted cost. Less optimistically, costs for contingencies such as deeper excavation, extensive grouting, foundation-treatment, and the like, should be calculated, thus leading to a range of cost-benefit ratios. See also, comments 1 and 2 for Section 2.1.9.2, comment for Section 2.2.3, comment 3 for Section 3.2.1, comments 1, 5, 7, and 9 for Section 4.1.3.1, comments 1 and 4 for Section 4.1.3.2, and comment 1 for Section 4.2.1.2.	
2.1.9.2 Par. 1	Complete grouting of these [McKinney pillow] lavas would be necessary. . . The cutoff grouting represents an approximate 8.6 percent increase over the estimated project construction cost. . . The latest information on grouting costs was used by FERC Staff in developing its own cost estimate . . . which is included in the economic comparison in Table 1-12.	
	1. The DEIS gives no detailed plan for grouting, although a plan is needed in order to calculate the cost. Even the feasibility of grouting as a means to mitigate leakage is not evaluated. Furthermore, the information on grouting costs used in making the estimate is neither explained nor cited, and the amount of the estimate itself is not specified. Without an explanation of the plan for grouting, its feasibility, and its budget, the cost of the project and its practicality cannot be independently evaluated. Why are these matters not explained? See also, comment 9 for Section 4.1.3.1, comment 4 for Section 4.1.3.2, and comment 1 for Section 5.2.1.5.	The cost of the grouting plan is discussed in Section 2.1.9.2 and reflected in Section 1.3.5. The details of the grouting plan are beyond the scope of the EIS. See revised Section 2.1.9.2. See revised Section 2.1.9.2. See Staff's response to Idaho Power Company in Appendix F.
2.1.9.2 Par. 2	Staff . . . has made an estimate of embankment cost which . . . raises the overall project cost by approximately 9.3 percent.	
	2. As above, information used in making the estimate is neither explained nor cited, and the amount of the estimate itself is not cited. How was the estimate made?	Staff compared the Applicant's cost estimate of embankment material with the Corps of Engineers' estimating guide and comparable projects. See revised Section 1.3.5.
2.2.1 Par. 1	The project facilities [for the Bliss Bridge Damsite] would be similar to those of the proposed A.J. Wiley Project, except that the powerhouse and spillway would be located on the left abutment of the river.	
	A plan for the Bliss Bridge Damsite is neither given nor cited. The lack of a plan raises several geological questions. Is the proposed placement of the powerhouse and spillway based on geological considerations? If so, what are they? What are the proposed foundation materials? What are the proposed materials of the abutments? Would the altitude of the river bed require dredging a channel downstream in order to achieve maximum generation of hydroelectric power? See also, comment for Section 2.2.3 and comment 1 for Section 3.2.1.	See Figure 4-7. See revised Section 1.3.1.1.
2.2.3	The only significant difference in construction [at the Bliss Bridge site] may be the absence of the grouting equipment necessary to seal off the right abutment pillow lava.	
	Figure 3-14 of the DEIS shows "McKinney pillow lava breccia" and "McKinney pillow lava breccia, incorporating rock fragments of Madson Basalt" as forming the right wall of the canyon below the level of	"Equipment" should be "requirement." See revised Section 2.2.3. The underlined quote is incomplete. The completed quote should include "... at the proposed site."

	the proposed reservoir at the site. Hence, the quoted statement and the figure are contradictory. Possibly, the quoted statement is meant to imply that pillow lava in the right abutment may be completely excavated during construction, leaving pillow lava only beneath the dam, or beneath only part of it. What indeed is the plan? And how does the excavating that I have inferred, if planned, affect the cost of construction? Also, what foundation conditions would exist if the excavating were to be done?	No response required. Comments were based on a misinterpretation resulting from an inadvertently incomplete quote. (See previous response.)
3.1.2.1 Par. 4	The depth of the inner canyon . . . averages between 50 and 100 feet. The inner canyon averages about 1,000-feet wide at its rim. The depth is more exactly given as between 175 and 200 feet below the terraces of the main canyon floor. The inner canyon is as narrow as 400 feet and is not generally as wide as 1,000 feet.	See revised Section 3.1.2.1.
3.1.2.2 Par. 1	The geologic units at the project are presented in Table 3-1. 1. The units described in the table pertain only to the lower reach of the project area. "Rock Lake Clay" in the table is correctly called "Root Lake Clay." Pillow lava of the McKinney Basalt in the table is described as including "alluvial black sands." What is the evidence that any of the pillow lava is alluvial? The Older Alluvium is described as being in "gradational contact with overlying McKinney Pillow Lava." Also, the description points out that "some of the debris [was] apparently deposited by viscous flow." The quoted phrases could give a geological reader a misleading understanding of the extent of geological knowledge about this highly variable geologic unit. Indeed, general information about the stratigraphy, origin, lithology, and distribution of the Older Alluvium is meager, and detailed information is virtually non-existent. The features that demonstrate gradational relations and viscous flow are described by me from the only existing outcrop, which is exposed in an area measuring 50 by 300 feet, half a mile downstream from the proposed Wiley site (Malde, 1981, p. 44-51). Because other information about the Older Alluvium comes only from a few scattered drill holes, it is not known whether such features are present elsewhere. In short, the description in the DEIS ought to bring out not only that the Older Alluvium is highly variable in lithology but also that knowledge of its variability is limited. Furthermore, the DEIS should make clear that the variability in the physical properties and the engineering significance of the variability, in terms of problems to be solved in designing a dam, have not been evaluated. See also, comment 7 for Section 4.1.3.1, comment 5 for Section 4.1.3.2, comment 2 for Section 4.2.1.1, and comments 2 and 3 for Section 4.2.1.2.	The descriptions in Table 3-1 are composite summaries of descriptions provided in the sources referred to in the footnote. "Alluvial black sands" was provided in the Applicant's Exhibit W (Idaho Power Company, 1981b). Staff believes that the table's description adequately reflects "the variability of the Older Alluvium." The EIS is not intended to be a design document.
3.1.2.2 Par. 1	Figure 3-1 is a geologic map of the project area. 2. The map represents only the lower reach of the project area. The explanation of the map shows an erosional unconformity between "McKinney Subaqueous Pillow Basalt" and "Root Lake Sediments." Appendix B, however, does not recognize such an unconformity. Neither do I (Malde, 1981, p. 14-21). For other comments on the map, see comment 1 for Section 3.1.2.3, comment 3 for Section 3.2.1, and comment 1 for Section 4.2.1.2.	Your opinion has been noted. The explanation on the Figure 3-1 map is the one included on the original figure in the IECO report (International Engineering Company, Inc., 1981a).

3.1.2.2 Par. 2	McKinney Pillow Lava . . . occupies part of an ancestral Snake River Channel that was deeper than the present channel. . . A series of simplified cross-section sketches showing the hypothetical origin of the pillow lava channel fill is shown in Figure 3-3. 3. The trench occupied by the pillow lava is 600 feet deep and is more properly called a canyon, not a channel. The phrase, "deeper than the present channel," is apparently intended to explain that the pillow lava extends below the present river level. Unambiguous language that explains the depth and width should be used. The term, "hypothetical," may imply to some readers that the origin of the pillow lava is problematical. Rather, the origin is not at all uncertain. Figure 3-3 could be cited as showing simply the origin of the pillow lava.	See revised Section 3.1.2.2.
3.1.2.2 Par. 3 Par. 4	Unconsolidated materials . . . are windblown dust . . ., river sands and gravels . . ., colluvium, talus, and landslide material. * * * Soils . . . have formed on the unconsolidated materials, all of which were originally derived primarily from basalt. 4. The unconsolidated materials were derived from many sources, near and far, and are only partly from basalt.	See revised Section 3.1.2.2.
3.1.2.3 Par. 2	The largest landslide area is the Bliss landslide . . . Portions of the toe of the landslide would be inundated by the proposed reservoir. 1. A map by Malde and Powers (1972) shows all the area of Root Lake Clay above the head of the landslide on Figure 3-1 as being material of the landslide itself. Also, I have reported that this area contains "blocks that have slumped from sediments of the Glenns Ferry Formation and from lava flows that form the canyon rim" (Malde, 1981, p. 52). Similarly, Malde and Powers (1972) show that the landslide extends across all the lower slope, down to river level, although Figure 3-1 shows much of the lower slope as being undisturbed colluvium. From the long geologic history of the landslide, which is recognized in the DEIS, it is not likely that the lower part of the slope is mostly undisturbed. Thus, as I comprehend the field relations, all the toe of the landslide would be inundated by the proposed reservoir, not just "portions." The discrepancies in the interpretations of the field relations should be recognized and resolved. See also, comment 3 for Section 3.2.1, comment 1 for Section 4.2.1.2, and comment 2 for Section 5.2.1.5.	Your interpretation has been noted. See revised Section 5.2.1.5.
3.1.2.3 Par. 2	Applicant also reports that rather than being one large slide, the area consists of several slump blocks with rotational failure zones that apparently are not connected at depth. 2. The quoted statement is contradicted by the applicant's investigation of the Bliss landslide (International Engineering Company, 1981a, pls. II-IV) in which the base of the landslide is shown to be a continuous failure zone. Furthermore, it is mechanically impossible for the blocks to slump without also moving on their undersides. With respect to the quoted statement, the applicant's conclusion (International Engineering Company, 1981a, p. 12) that movement on numerous failure zones would have a higher	Your interpretation has been noted. Your opinion has been noted.

	factor of safety is debatable, to the degree that movement on a continuous failure surface is more likely.	
3.1.2.3 Par. 3	Some sliding also occurred along [the south side of] the river at some time in the past when blocks of Upper Banbury Basalt were apparently undermined by the river and subsequently slumped. 3. The phrase, "at some time in the past," is needlessly vague in light of contemporary observations of slumping by residents in the area. Because the basalt would form the left abutment of the proposed Wiley site, and because the basalt is also present at the Bliss Bridge site, the rate of slumping pertains to an assessment of dam safety. What information exists by which the rate can be determined?	Your opinion has been noted. Conditions that would cause slumping of the basalt do not appear to be present in the left abutment at this time. The possibility of project-induced instability in the abutment basalt will be determined in the final design stage, at which time suitable corrective measures will be designed. Staff's independent analysis has determined that a safe project is feasible.
3.1.2.3 Par. 5	Several permeable formations are known to exist at the proposed damsite. 4. Melon Gravel in the proposed reservoir area is also permeable but is not mentioned.	See revised Section 3.1.2.3.
3.1.2.3 Par. 5	Permeable McKinney Pillow Lava occurs in the right abutment and beneath much of the proposed reservoir. 5. The pillow lava also underlies the intake and spillway sections of the proposed Wiley site.	See revised Section 3.1.2.3.
3.1.2.3 Par. 5	The Upper Banbury Basalt . . . may be prone to rapid weathering and deterioration during prolonged exposure due to hydrothermal groundwater alteration that occurred under former geologic conditions. 6. More exactly, the Banbury may be prone to rapid weathering by wetting and drying of swelling clays that formed in the past by hydrothermal ground-water alteration (Malde, 1981, p. 42-44). Use of the phrase, "prolonged exposure," may misleadingly suggest to some readers that the basalt may deteriorate only after several decades or centuries. Instead, basalt subject to rapid weathering typically deterioriates in a matter of weeks or months.	Your opinion has been noted.
3.2.1 Par. 1	The physiography, topography, geology, and soils are generally the same [at the Bliss Bridge site] as described for the proposed [Wiley] project. 1. The quoted statement seems to be intended to imply that the geologic hazards are also the same. What are the similarities? Also, what are the differences implied by the term, "generally"?	Section 3.2.1 discusses the similarities and differences of the geologic hazards at the Bliss Bridge site compared to those at the proposed site.
3.2.1 Par. 1	The cross-section shows that fewer pillow lavas are present at this alternative [Bliss Bridge] site. 2. Because the pillow lava underlies all the site at thicknesses ranging up to 117 feet, what is meant by the phrase, "fewer pillow lavas"?	The pillow lava at the Bliss Bridge site thins out in the right and left abutments, whereas the pillow lava at the proposed site is at least 200 feet thick at the right abutment, and considerably thicker for an unknown distance beyond the abutment.

3.2.1 Par. 2	A small portion of the toe of the Bliss landslide, located at the end of the right abutment of the alternative [Bliss Bridge] damsite, would need to be removed. 3. As discussed in comment 1 for Section 3.1.2.3, interpretations differ on the extent of the Bliss landslide. Figure 3-14 of the DEIS shows 25 feet of colluvium in the area of the proposed right abutment, which is an exceptional thickness for undisturbed colluvium. Possibly the colluvium is landslide material. Perhaps some of the underlying Root Lake Clay is also disturbed. If so, the extent of landslide material that would need to be removed could be much larger than the amount expressed by the words, "small portion." I gather from the DEIS that the quoted statement is based on Figure 3-1 and drill hole DH 6-81. Clearly, a design for the site (hence, also, an estimate of the cost) should be based on more geologic knowledge of the potential landslide hazard. If this information is not required at this time, the DEIS should explain why the information is not thought to be essential.	See revised Section 3.2.1. The EIS is not intended to be a design document. Staff believes that the information available is sufficient to determine that a safe project is feasible.
3.2.1 Par. 2	Other stablization measures would also be anticipated. 4. The quoted statement is given in the context of the right abutment of the proposed Bliss Bridge site, but the anticipated measures are not defined.	Mitigative measures for the Bliss Bridge site are discussed in Section 4.2.1.2.
4.1.3.1 Par. 3	The rate of bank erosion would be diminished with the establishment of a new shoreline equilibrium. 1. Bank erosion would depend on the nature of the geologic materials at the shoreline, which would range from clay to basalt and which would vary in inherent stability. Active landslides in clay are especially likely to be increased by the proposed reservoir, thus reducing reservoir capacity and correspondingly decreasing the economic benefit of the project (Malde, 1981, p. 58). Because slumping along the proposed reservoir shoreline is recognized in paragraphs 4 and 7 of this section, to what extent was this factor included in the economic analysis summarized in Table 1-12? See also, comments 2 and 6 below.	See Section 4.1.3.1.
4.1.3.1 Par. 4	The Applicant and FERC Staff . . . have analyzed the landslide potential of the slopes along the shore of the proposed reservoir and have determined that there would be no . . . landsliding that would endanger the public, or adversely impact the operation of the project. 2. What was the basis of the analysis? Was private property considered? Was public property considered? What impacts on the proposed project were considered? What were the findings of the analysis? See also, comment 6 below and comment 1 for Section 4.1.3.2.	The areas of sliding being affected by the reservoir are within the proposed project boundary.
4.1.3.1 Par. 5	The slope [of the Bliss landslide] is very stable with an overall slope angle of 9 degrees. 3. Because an investigation by the International Engineering Company (1981a, p. 8) found evidence of recent movement of the landslide,	The Bliss clay deposit as a whole is very stable and will not slide as a unit into the proposed reservoir. See Section 4.1.3.1 and Figure 4-1.

what is meant by the words, "very stable"? Also, what interval of time is represented by the 1 inch of movement reported by the applicant (International Engineering Company, 1981a, p. 2-3)? The reference to the overall slope fails to bring out that the lower slope is notably steeper than the upper slope. I have reported that the lower slope gradient is 22% (12°), whereas the upper slope is 15% (8°) (Malde, 1981, p. 32). The quoted statement is also inconsistent with the predicted creeping and slumping discussed in comment 4 below.

4.1.3.1 Par. 3, Some small hills within the [Elise landslide] slide area have slopes greater than 20 degrees, and . . . creeping and slumping would probably occur over time until no slopes are greater than 20 degrees.

4. Because the slopes are in places now more than 20 degrees, despite the long geologic history of the Elise landslide that is recognised in Section 3.1.2.3, what is the geological or engineering basis for the prediction that the future slopes will not be greater than 20 degrees? See also, comment 5 below.

It is a fairly well accepted principle that soil slopes will slump with the passage of time until they reach the natural angle of repose for the soil of which they are constituted.

4.1.3.1 Par. 6 That portion of the slope [of the Elise landslide] that is above elevation 2,800 feet would not . . . be affected by the reservoir (Figure 4-1). The toe of the slope could fail, as shown by the dashed line representing the soil surface after failure, but the localized slumping would not affect public safety or operation of the proposed project.

5. Is the dashed line based on an engineering study? If so, what kinds of tests and assumptions were used? With regard to failure of the toe, the applicant reports (International Engineering Company, 1981a, p. 13) that the landslide toe is below the existing water table, and it is predicted that the proposed reservoir will have "little effect on upon the stability of the slide mass other than local slumping at the reservoir rim." However, the paucity of springs where the indicated water table intersects the surface suggests that the landslide is not now continuously saturated in this area. Hence, if the water table is actually lower than shown, inundation of the toe would lower the shear strength and decrease the stability of the slope. Rapid fluctuations in the level of the proposed reservoir, which would be normal when producing hydroelectric power, can also be expected to adversely affect the stability of the toe. The quoted statement about public safety also deserves comment. Because the property of Ted Ramaklus and the public road are below an altitude of 2,800 feet and, hence, are within the stated range of possibl- failure of the toe of the slope, what is meant by the conclusion .. "localized slumping would not affect public safety"? With respect to the effect of slumping on the proposed project, what consideration was given to the economic effect of the resulting reduced capacity of the reservoir?

The dashed line is based upon slope-stability analysis performed by Staff using the modified Swedish method of slope analysis with an interval angle of friction of 19.8 degrees with no cohesion, and based upon engineering judgement.

Large reservoir fluctuations that would produce a rapid drawdown condition are not part of the operating regime of the proposed project.

Staff believes that the Ramoklas residence is located on a piece of land underlain by a section of Banbury Basalt, and therefore would not be affected by the presence of the reservoir. A Board of Independent Consultants would address the stability of the reservoir rim; Licensee is responsible for mitigation of any damage caused to the property of others. See Section 4.1.3.1, Landslide potential.

There would be no economic effect of slumping because the expected volume of possible slumping would be negligible compared to the reservoir volume, and because the project benefits are a result of the head of the project, not the storage, since it is a run-of-river project.

4.1.3.1 Par. 7 Inundation . . . of clay slopes along the south shoreline of the proposed reservoir would cause . . . slides. Such sliding would be . . . of insufficient volume to produce any noticeable effect on reservoir capacity or public safety.

	6. The recognized areas of potential instability along the shoreline should be shown on a map and filed with the County Planning Office for use in decisions on future land use. The map should be based on field surveys by a geologist who is familar with the geology of the project area. The DEIS should explain that such a map would be required if the project is licensed. Furthermore, if recreational use of the proposed reservoir is contemplated, the DEIS should explain how users would be protected from the blocks that might fall into the reservoir.	Your opinion has been noted. See Section 4.1.3.1.
4.1.3.1 Par. 9	The Older Alluvium . . . could become very unstable if brought in contact with water such as by seepage through permeable zones. Because of this . . . the Older Alluvium may prove to be unsuitable as a foundation material. The presence of this material may require the use of special treatment techniques and/or selective removal of undesirable material from beneath the project structures.	
	7. The quoted sentences are properly cautious about placing any part of the proposed dam on the Older Alluvium. Similar caution should be exercised when contemplating using Older Alluvium as part of any abutment. Plans for construction that are based on the premise that the Older Alluvium can be safely used as a foundation or as an abutment should be based on thorough exploration of its variable physical properties, on tests of its behavior under the hydrostatic conditions and loads that would be imposed by the proposed reservoir and structures, and on practical engineering solutions that would deal effectively with the identified problems (Malde, 1981, p. 49-51). For example, even minor differential settling under the proposed intake and spillway section could endanger the dam (Malde, 1981, p. 51). The DEIS makes clear that such exploration, testing, and engineering have not been done. Without this information, the feasibility and the true construction cost of the project cannot be evaluated. That is, studies still pending may show that costly work may be required, such as selective excavation of the Older Alluvium, complete excavation, or elaborate cut-off curtains, buttresses, or caissons. Because the need for such methods of construction cannot now be ruled out, and because such work would change the nature of the impacts that have been considered, as well as the cost, why is this information not thought to be essential at this time? See also, comment 1 for Section 3.1.2.2 and comment 2 for Section 4.2.1.2.	These matters would be more appropriately resolved during the design stages of the project. The EIS is not intended to be a design document. These matters would be more appropriately resolved during the design stages of the project. The EIS is not intended to be a design document.
4.1.3.1 Par. 10	Banbury Basalt . . . may be subject to . . . deterioration during prolonged exposure.	
	8. See comment 6 for Section 3.1.2.3.	Your opinion has been noted.
4.1.3.1 Par. 11	Permeable McKinney Pillow Lava, found in the right abutment . . . would constitute a potential path of seepage . . . Preventing seepage through the pillow lava would require construction of a subsurface cutoff.	
	9. See comment 5 for Section 3.1.2.3. Because of the need to analyze the cost of construction, explain that the cutoff would extend from the beneath the dam to the buried northern wall of the ancestral canyon. Thus, the cutoff would be about 2,300 feet long,	The costs are considered in revised Section 2.1.9.2 and reflected in Table 1-9 of revised Section 1.3.5.

	and its maximum depth would be 185 feet (Malde, 1981, p. 38).	
4.1.3.2 Par. 2	The Applicant has not proposed . . . measures . . . to prevent minor slumping along the reservoir shoreline. However, if . . . large-scale slope movement were to occur, mitigative measures such as upslope drainage diversion or dewatering would be used. 1. What is meant by the terms, "minor" and "large-scale"? Several additional mitigative measures to stabilize the toe of the Bliss landslide are mentioned in Section 4.2.1.2 and should also be given here. Because such measures have been anticipated, the economic comparison in Table 1-12 should include estimates of their probable cost. See also, comment 1 for Section 4.2.1.2.	The terms are the Applicant's. The measures presented in this section include only those proposed by the Applicant for the proposed project. The intent of the table is not to provide for such a detailed cost itemization, but the numbers in the table do include these costs.
4.1.3.2 Par. 3	Potential seepage through the . . . Upper Banbury Basalt [at the Wiley site]. . .would be minimized by sealing exposed joints and fractures with gunite or shotcrete. 2. Measures to mitigate rapid weathering of Banbury Basalt are proposed for the Bliss Bridge site (Section 4.2.1.2) but are not described for the proposed Wiley site. See also, comment 2 for Section 4.2.1.2.	The measures presented in this section include only those proposed by the Applicant for the proposed site.
4.1.3.2 Par. 3	Exposed portions of Bed 2 would be covered with an impervious blanket of clay to prevent piping and if necessary, curtain and consolidation grouting would also be used. 3. These measures would also be appropriate for Bed 1, which is described in Table 3-1 as containing beds of tan silt.	Your opinion has been noted.
4.1.3.2 Par. 3	Subsurface seepage [through McKinney Pillow Lava] would be controlled by a grout curtain cutoff. 4. A design for the grout curtain is not given. A determination of the technical feasibility of grouting, together with an estimate of its cost, requires a field test at the site (Malde, 1981, p. 38), but no testing has been done. Lacking this information, how can the design of the dam and its cost be evaluated? See also, comment 1 for Section 2.1.9.2 and comment 1 for Section 5.2.1.5.	Staff's cost considerations (Section 2.1.9.2) assume design requirements that would be imposed by worst-case conditions and are reflected within the cost figures presented in Table 1-9 of revised Section 3.1.5.
4.1.3.2 Par. 3	The foundation beneath the dam would be cleared of all Recent Alluvium and slopewash. 5. Selective treatment and/or removal of the Older Alluvium, which are mentioned in Section 4.1.3.1, are not discussed here as mitigative measures. What measures are planned? See also, comment 7 for Section 4.1.3.1.	The measures in this section include only thos proposed by the Applicant for the proposed project.
4.2.1.1 Par. 1	The right abutment of the proposed [Bliss Bridge] dam would impinge upon a portion of the toe of the Bliss landslide. 1. See comment 3 for Section 3.2.1.	The EIS is not intended to be design document.

4.2.1.1 Par. 2	Seepage . . . would require consideration of problems . . . such as . . . wetting and weakening of highly weathered foundation materials. 2. The statement seems to refer in part to adverse properties of the Older Alluvium. What consideration would be given? See also, comment 7 for Section 4.1.3.1.	Considerations would focus on suitable treatment of the problems. This would be done during the design stage. See Section 5.2.1.5.
4.2.1.1 Par. 2	The ancestral Snake River channel is almost directly below the present river at the Bliss Bridge damsite. 3. The quoted statement apparently refers to the distribution of the McKinney pillow lava. Drilling by the applicant shows that the McKinney is underlain by Older Alluvium, which also occupies the ancestral canyon, but the northern limit of the Older Alluvium at the site is not yet known. Hence, the form of the ancestral canyon is still undetermined.	Your opinion has been noted.
4.2.1.2 Par. 2	Applicant has suggested the possibility of stabilizing the toe of the Bliss landslide by removal of part or all of the landslide material below reservoir elevation, construction of large retaining walls, [and several other mitigative measures]. 1. If removal of the toe of the landslide is a contingent cost, the accuracy of geologic information about the extent of the landslide is an economic factor, in the sense that the landslide area may be larger than shown in Figure 3-1. See also, comment 1 for Section 3.1.2.3 and comment 2 for Section 5.2.1.3.	Applicant has retracted this suggestion. See Applicant's comment No. 35 on the DEIS and revised Section 4.2.1.2.
4.2.1.2 Par. 3	The Applicant's suggested remedial measures for weatherable Older Alluvium and Upper Banbury basalt include placing concrete structures and embankment materials on freshly exposed weatherable surfaces, or spraying a protective cover of asphalt on freshly exposed weatherable surfaces. 2. The embankment materials include "random fill" and "select transition-drain filter material," both of which would be more or less saturated and in contact with the Older Alluvium. Thus, the Older Alluvium would become wet and could lose its strength. Also, to the degree that wetting of the Older Alluvium is as likely to take place from below as from above, an effort to seal the upper surface could prove to be a short-sighted measure. The Banbury would be subject to wetting and drying through the embankment materials as the level of the reservoir fluctuates, although the actual response of the Banbury to wetting and drying has not yet been determined by petrographic study and standard tests (Malde, 1981, p. 43, Appendix D). Thus, the surface of the Banbury should not be covered directly by embankment materials but should be protected. Because a spray coating of asphalt could deteriorate, an additional barrier of flexible material within the embankment itself might provide the needed protection. Because of the anticipated rapid weathering of the Banbury Basalt, I note that the applicant now recognizes that "this property makes the basalt unsuitable for use as riprap for slope protection" (International Engineering Company, 1981b, p. 3-5).	Your opinion has been noted. Your opinion has been noted. Your opinion has been noted.

4.2.1.2	Mitigative Measures Proposed [for the Bliss Bridge site]. 3. Measures to mitigate leakage through the McKinney pillow lava, to mitigate seepage through the Banbury Basalt and the intercalated sedimentary beds, to mitigate foundation problems posed by the Older Alluvium, and to relieve hydrostatic uplift pressures (as mentioned for the proposed Wiley site in Section 4.1.3.2) are not discussed.	The measures specifically presented in this section include only those proposed by the Applicant for the Bliss Bridge site. See revised Table 4-5 (Geology and Soils) and revised Section 5.2.2.
4.2.1.3	Unavoidable Adverse Impacts [for the Bliss Bridge site]. The unavoidable impacts include loss of reservoir water by leakage if an effective barrier cannot be constructed (as mentioned for the proposed Wiley site in Section 4.1.3.3).	Seepage at the Bliss Bridge site does not appear to be as potentially severe a problem as at the proposed site, and, it is presumed, could be more efficiently dealt with.
5.2.1.5 Par. 1	Staff believes that a subsurface cut-off should be constructed . . . Suitable design measures and construction techniques are available. . . . Typically, design problems of this nature are addressed by a Board of Independent Consultants and FERC Staff. 1. The feasibility and cost of constructing a cutoff have not been determined. See comment 1 for Section 2.1.9.2 and comment 4 for Section 4.1.3.2. Unless the design measures that are contemplated are explained, non-expert readers are given no basis for evaluating the optimism of the statement that "suitable . . . techniques are available." In short, the reader is asked to accept the conclusions blindly. The statement that "problems of this nature are addressed by a Board of Independent Consultants" postpones investigations of feasibility and determinations of the cost to some indefinite future date. Rather, it would be timely to convene an expert board now. See also, my general comments.	Staff's independent analysis has determined that safe projects are feasible at the proposed A.J. Wiley site and at the Bliss Bridge alternative site. Staff's cost considerations for both sites necessarily reflect mitigation of assumed worst-case conditions.
5.2.1.5 Par. 2 Par. 3	The inundated toe of the Bliss landslide and other slide areas could be controlled. Other . . . programs . . . could be implemented. 2. The quoted statements do not specify that control would indeed be required, or that programs would be implemented, using procedures listed in Section 4.2.1.2. The language is needlessly vague in light of the control that seemingly would be required if "large-scale movement were to occur" (Section 4.1.3.2). Indeed, unless the specified controls are used, failure of the Bliss landslide is likely and cannot be ruled out. Thus, a control program is needed at the outset. Also, before controls are applied, new stability analyses should be made so that the effect of the controls can be determined. For this purpose, conventional wisdom suggests that the minimum factor of safety should be increased to about 1.3.	See revised Section 5.2.1.5. See revised Section 5.2.1.5. Your opinion has been noted.
5.2.1.3	[Mitigative Measures Recommended for the Wiley site] r logy. 3. Section 4.1.3.2 mentions a number of proposed mitigative measures for the Wiley site, other than those discussed here. What is recommended with respect to these proposals? See also comments 1-5 for Section 4.1.3.2.	Measures presented in this section are those measures recommended by Staff, to be considered in addition to the Applicant's proposals.

5.2.2.1	Preliminary investigation of the Bliss Bridge site indicated that no serious foundation problems exist that would require extensive remedial measures. 1. Because Older Alluvium is found beneath the entire site (Figure 3-14), and because "this material may require . . . special treatment techniques and/or selective removal," the quoted recommendation is inconsistent with other findings in the DEIS.	"Special" does not mean "extensive." Your opinion has been noted.
5.2.2.1	[Mitigative Measures Recommended for the Bliss Ridge site] Geology. 2. Section 4.2.1.2 mentions a number of proposed mitigative measures for the Bliss Bridge site, other than those discussed here. What is recommended with respect to these proposals? See also, comments 1-3 for Section 4.2.1.2.	Measures presented in this section are those measures recommended by Staff, to be considered in addition to the Applicant's proposals.
APPENDIX B		
Par. 8	The overflow [of Root Lake] probably occurred because the [Root lake] clays sufficiently sealed the outflows through the [McKinney] pillow lavas. The cause of overflow of Root Lake has not been deduced in the publications that are cited.	The cause of the overflow was deduced by Staff. See revised Appendix B.
Par. 9	The Snake River . . . began to re-excavate the old ancestral canyon that had originally been cut in . . . the Banbury Basalt. Canyon cutting did not necessarily re-excavate an earlier canyon in the Banbury Basalt. The inferred path of the concealed ancestral canyon in the Banbury is shown by Malde (1981, fig. 8).	See revised Appendix B.
Par. 12	McKinney floor. The correct words seem to be "McKinney flow."	Correction noted. See revised Appendix B.

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Friends of the Snake River
P.O. Box 28, Bliss, Idaho 83314

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FEDERAL ENERGY REGULATORY COMMISSION

POOR ORIGINAL

April 28, 1982

FEDERAL ENERGY REGULATORY COMMISSION
DOCKETED
MAY 3 1982

Dear Mr. Kenneth Plumb and Commission Members:

Re. A. J. Wiley Project
Project No. 2845

I would like to take this time and opportunity to voice objections to Idaho Power's proposed A.J. Wiley Dam Project. My primary concern is whether a project of this magnitude and expense should be allowed without addressing and precisely answering specific geological considerations: (1) the permeability of the damsite and adjacent area and the information on such by Dr. H.E. Malde of the U.S. Geological Survey; and (2) the lack of information on the benefit and the feasibility of Idaho Power's proposed grout lines and screens. These uncertainties and unknowns are of direct consequence to the dam construction and as yet Idaho Power has not offered any data to show that the risks and past geological history do not outweigh the suggested benefits.

See revised Section 1.3.5 and Staff responses to Dr. H. Malde.

Another point, with respect to the geological considerations, is the lack of itemized cost on these projects. Potentially these costs are the most expensive part of the project. Are we, as customers, responsible for this lack of preparation and awareness of the cost factors through future rate hikes? Shouldn't these most basic factors be of primary consideration in determining the feasibility of the project?

Staff included the cost of special foundation treatment necessary to overcome the potential geological problems. See revised Sections 2.1.9.2 and 1.3.5.

Idaho Power's suggested benefits from the proposed dam are 86 MW. This is far less than the PUC's estimate of potentially over 200 MW from independently produced small hydro power. What is the purpose of a dam that could so easily be outproduced and so quickly unable to meet projected needs?

See revised Sections 1.3.2.2 and 1.2.5.

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Perhaps a serious, sincere and honest re-evaluation of consumption and small scale alternatives should be conducted and a determined effort made to utilize alternative sources of power. ie. small private hydro projects. Idaho Power is in the "energy business" and as such should accept the burden of educational responsibility to educate the people of the state of Idaho in conservation, efficient energy usage and available alternatives. This would be more productive on a long-term basis than Idaho Power's currently proposed dam project.	See revised Sections 1.3.2.2 and 1.2.5. Your opinion has been noted.
There are too many financial, benefit and ecological questions left unanswered to demonstrate genuine thoughtfulness on the part of Idaho Power for this project. I fail to see adequate demonstration from Idaho Power that the cost/benefit factors outweigh the ecological/consumption risks and needs, so I would ask you to deny Idaho Power's A.J. Wiley Project, No. 2845	Your opinion has been noted.

Respectfully,

Nancy E. [illegible]

Rt. 3

Buhl, Idaho 83316

cc. Idaho Public Utilities Commission

Friends of the Snake River

George +
Macky Roberts
R.R. 1 - Box 164
Moscow, Idaho 83843

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april 28, 1982

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FEDERAL ENERGY
REGULATORY
COMMISSION

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington D.C. 20426
(Attention: Kenneth Plumb)

Dear Mr. Plumb,

We are writing in opposition to the A.J. Wiley Dam.

It is very wrong to impound the last large stretch of whitewater of the Snake River in South Idaho. On the assumption that more power will be needed, coal-produced power is cheaper when all cost factors are totaled and has less impact on the environment.

Please include our letter in the Final Environmental Impact Statement for the A.J. Wiley Project No. 2845.

Sincerely,

George + Macky Roberts

Copy: Idaho Public Utilities Commission

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See revised Sections 1.3.5, 5.4, and Summary.

Friends of the Snake River
P.O. Box 28, Bliss, Idaho 83314

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FEDERAL ENERGY REGULATORY COMMISSION

Federal Energy Regulatory Commission
825 North Capitol N. E.
Washington D. C. 20426
(Attention: Kenneth Plumb)

Dear Sir:

I am writing to express my opposition to the proposed A. J. Wiley Dam on the Snake River affecting the stretch between Bliss Reservoir and Lower Salmon Falls Dam. If this project were carried through it would eliminate the last white water stretch remaining on the river and would destroy habitats of rare flora and fauna.	See revised Summary and Section 5.4.
Other options have either not been sufficiently studied or presented. It is also clear that the need for increased power will be met in other ways, most probably by one of projects for the Milner Dam.	See revised Sections 1.2.5.3, and 1.3.2.
The terrible increase in cost for the Wiley project is another factor against this option.	Your opinion has been noted.

I hope you will not give clearance to it without further study of alternatives.

Respectfully yours,

Mary Kirkwood

Moscow, Idaho

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FEDERAL ENERGY REGULATORY COMMISSION

April 24, 1982

William K. Chisholm
Rt. #3 Box 268
Buhl, Idaho 83316

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D.C. 20426

(Attention: Kenneth Plumb)

Dear Sir,

I am aware of the recently completed Draft Environmental Impact Statement for the A.J. Wiley Dam Project (Project # 2845), and I have some comments and concerns which I feel are of importance in this matter and which I would like to be included in the final EIS on the Wiley project.	No response required.
I have been involved heavily in the energy debate here in Idaho for some ten years. I use the word "debate" very loosely because in reality it's been pretty much a battle with the money and political power of the utilities stacked against the concerns of the people of Idaho. For these ten years I have, along with others, been calling for a discussion, an inventory if you would of what we have, what our possibilities are, and where we are going in regards to energy. That discussion on energy policy has been thwarted by the utilities and in my experience, mostly by Idaho Power. They want to make energy policy.	See revised Sections 1.2.5 and 1.3.2.
In 1981 the Energy Policy Board appointed by the Governor of Idaho completed a draft energy policy. It was our first opportunity to get together a public policy on energy. The plan emphasized the importance of conservation and the use of alternative and renewable energy resources. Thanks, I'm sure in much part to the lobbying effort of Idaho Power, the 1982 Idaho legislature failed to act on the plan. So here we are, still no policy and it has to do with the political environment, the politics of energy; a real consideration on any project.	No response required.
Without an energy policy, without a review of our energy needs and the means of either conservation or production; how can it be said, given the economics and the geologic questions of the Wiley project, that we need it. We haven't even scratched the surface on getting our energy habit in control. The Wiley DEIS doesn't deal with the amounts of energy we can save through good conservation methods, the implementation of solar space and water heating, energy efficiency in our building and machinery design, co-generation possibilities, etc.	See revised Sections 1.2.5, 1.2.4.1.
I don't like to be constantly held in a position of fighting the utility, but I can't see selling out the people and environment of Idaho, just so Idaho Power can increase its rate base.	No response required.

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POOR ORIGINAL

Chisholm
Wiley Dam
Project # 2845
page 2

The Wiley project is another case of the utility setting energy policy with no total concept as to the Idaho lifestyle/environment. There is more to life than kilowatt/hrs. The importance to man, animal and plant life of that free flowing stretch of the Snake River can't be measured in dollars and cents; and that's probably why it's not well laid out in the EIS. There is value in the way one lives, in the plant and animal life along the river and in it, in the recreational pursuits of the people and in the natural state of our environment.

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Let's quit putting the cart in front of the horse. Doing things just because it is possible, does not make it justifiable. I have said many times in public testimony let's look at all the values, review and scrutinize all the ramifications and this includes the spiritual and the political aspects of our decisions. I hold to that line and ask that you and your people do to. As this project site, it should be rejected.

In Peace,

William K. Chisholm

William K. Chisholm

cc: IPUC

Your opinion has been noted.

Your opinion has been noted.

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FEDERAL ENERGY
REGULATORY COMMISSION

Mr. Kenneth R. Plumb
Secretary
Federal Energy Regulatory Commission
825 N. Capitol N.E.
Washington, D. C. 20426

Dear Mr. Plumb:

The following are our comments, as intervenors, to the Draft Environmental Impact Statement issued for the A. J. Wiley Project No. 2845:

Page 2, Paragraph 2: In the sentence which begins "The Wiley Reach", after the word "historic", there should be inserted the modifiers "fast-moving". Throughout the document the incorrect impression is given that the Wiley Reach is the last free-flowing section of the Snake River. It is, instead, one of the last free-flowing fast-moving sections of the Snake River and as such, worthy of preservation.	See revised Summary and text.
Page 1-25, Section 1.3.3.3. The geothermal operations already working in the Hagerman-Bliss area have not been mentioned in this document. In August of 1981 the Idaho Public Utilities Commission made a 2 day tour of geo-thermal developments already fueling several businesses in this area. A recent 2 hour television program originating in Seattle and concentrating on the energy problems of the entire Northwest, devoted one section to the White Arrow Geothermal development 7 miles north of Bliss. Geo-thermal power, and power potential, make a viable alternative to Wiley Dam when coupled or matched with other power sources.	No response required.
No attention to "stand-alones" is given anywhere in this document. In his book THE THIRD WAVE, Alvin Toffler states, "Hidden inside our advance to a new production system is a potential for social change so breathtaking in scope that few among us have been willing to face its meaning. For we are about to revolutionize our homes as well." This quote, from the chapter called "The Electronic Cottage" outlines the very real possibilities of advanced electronic industries being operated by individuals in energy self-sufficient "cottages". Idaho, with a state policy which encourages the growth of small, clean electronic industries, is a natural for this kind of development. The future Toffler talked about is already upon us.	There is no way to estimate how much power could be generated by consumers themselves, or to estimate when consumers would choose to become self-sufficient rather than utilize the convenience and economy of dependence upon the local power company. Not everyone has access to cheap power resources, as you imply.

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FEDERAL ENERGY REGULATORY COMMISSION
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There is constant increase in the number of individuals who, through conservation techniques and utilizing solar water heaters and other small solar, wind and hydro units, are reducing the amount of energy they need to buy from the grid. In fact many people are opting not to hook up to the grid at all, but to "stand alone". One of the side-effects of PURPA being noted by all of us familiar with the scene is that many people are turning up sites which they first think can be linked to a utility. Upon discovering that they are too far from a line, they are going ahead with plans to build hydro plants for their own uses. Every week we are sought out by people from all over the Northwest who want advice or want to buy hydro equipment from us. Just recently the Mayor of Preston, Idaho, visited here with his city council. They had learned of our successful hydro plant and were touring it as well as others in the neighborhood. With Cook Electric of Twin Falls doing their engineering, the city of Preston has plans to develop 300 KW of energy from dropping their domestic water supply and then marketing the power, through PURPA to Utah Power and Light. These are several classes of "stand-alones" which will be difficult to assess but will add substantially to conservation in this decade and beyond. REDOX, a storage system for stand-alone stations being developed by Norman Hagedorn, Lawrence H. Thaller and Mark A. Hoberecht for NASA shows great promise because of its long life cell balance and input-output flexibility. See Attachment A from DOE/NASA 12726-15	Conservation and small hydro development were considered in the load-forcasting studies performed by Applicant. See revised Sections 1.2.4.1, 1.2.5 and Appendix A.
The reason there is so much disappointment in wind development goes right back to "Grandpa's Knob". The Department of Energy backed demonstrations are flawed because of scale. If we are bent on putting wind power into the grid, then the installations must be sized smaller than 100 KW and must be "farmed in" along data-proven windstreams in massive numbers. Where wind machines will be most important is in conjunction with mini-hydro, photo-voltaic and solar installations. Please see Attachment B	Small wind-power unit development is not an option for the Applicant but is an option open to the Applicant's customers; it is expected that units will be installed when it becomes economical or convenient to do so. In the meantime, the loads must be served by resources that can be developed by Applicant.
Page 2-26, Section 2.4, Paragraph 1.7.2 This section, as written, suggests that a denial of the application for Wiley Project No. 2845 would result in absolutely NO power development on that stretch of the river. A "no-action" alternative would provide the public with the continued use of this reach of the Snake River, hense the wildlife, vegetation, recreational, aesthetic,	See revised Section 2.4.

TRUS JOIST CORPORATION
9777 West Chinden Blvd.
P.O. Box 60
Boise, Idaho 83707
208/375-4450

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REGULATORY COMMISSION

ATTACHMENT B

April 29, 1982

Mr. Aldrich Bowler
Snake River Pottery
Star Route
Bliss, ID

Dear Dritch:

This is to inform you that in my research in designing, building and operating medium size wind turbines, I have come to the following conclusions:

> Medium size turbines are more cost efficient than large turbines such as Mod 2 configurations and can produce electricity at a cost of from 4 to 6 cents per killowatt hour depending on site efficiency.
>
> I have read cost studies that put medium size turbines as low as 3¢ killowatt hour.

It is interesting to compare these cost figures with estimated cost of Wiley Dam produced power which ranges from 7.57 to 8.78 cents.

Sincerely,

A. L. Troutner
Vice President, Research
and Development

ALT/jg
cc: Walt Minnick

F-136

archeological and socio-economic values of the river described in Section 3.1 would be maintained. The "unavoidable adverse impacts" of the dam would be avoided. The 3 existing small hydro plants could continue to produce energy; the 6 or 7 potential small hydro plants applying for permits to build and market under PURPA could probably be granted exemptions with considerably fewer adverse effects that Project No. 2845.	
Bulb Turbines could be installed at each of the rapids in the Wiley Reach with far less environmental impact than is caused by a reservoir.	See revised Section 1.3.2.3.
The "No Action" section should be re-phrased to say that the denial of the license for Wiley would allow opportunity for "other action" as far as energy development is concerned.	See revised Section 2.4.
Page 3-44, Section 3.1.7, Paragraph 3	
It was very refreshing to find this paragraph in such a long, technical document. It gave us hope that the authors, however scientific they are forced to be in their observations, still have eyes, ears, hearts and souls.	No response required.
Page 4-34, Section 4.1.11.3	
The language used in this section is perfunctory to the point of being offensive. The "adversities" that are considered "unavoidable" are scarcely touches. "Area residents whose property would be inundated by the proposed reservoir", the narrative states, "would be forced to relocate their homes and businesses". How could we relocate our business if it were based on white-water rafting in the Wiley Reach of the Snake River as is the enterprising Snake River Expeditions, Inc.?	See revised Sections 4.1.11.1 and 5.2.1.8.
Our business, the Snake River Pottery, depends for its success on 35 years in the same location, on a beautiful bend where the Snake River foams into rapids.	See revised Sections 4.1.11.1 and 5.2.1.8.
Nowhere in the document do we find the costs of attempted "relocations" of these homes and businesses counted into the per KW cost of Wiley.	Any additional costs that may be incurred would be covered by a 15 percent contingency cost, which is part of Exhibit H of the Application (Idaho Power Company, 1981b).
Nowhere in the document is the Snake River Pottery identified as the cultural and educational resource which it is. During just one 30 day period this spring, 535 children and adults have visited this establishment on field trips for cultural-educational tours. These were elementary school children from throughout Gooding County, voc-ed students from high schools (3 public, 1 Parochial) in	Your opinion has been noted.

Boise, a convention of AirStream trailer owners, a Botany class from Idaho State University at Pocatello, and groups of teachers, both with the students, and in separate delegations from a Home Economics Seminar and a Migrant Education Workshop. We think the Snake River Pottery should be listed as an "Educational and Cultural Resource" as you would a museum or a state park.	
The third point upon which we would like to comment in this section deals with our hydro plant. Of the 3 small hydro plants whose inundation is mentioned among "unavoidable adverse impacts", ours is the only one with "grandfather" or constitutional water rights. Our site has produced power constantly since 1932 and has proof rights which precede state statutes.	No response required.
The Snake River Pottery has been working for nearly a year to negotiate a contract, through Cook Electric in Twin Falls, Idaho, which would capitalize the redevelopment, for the sale of energy produced thereby to Idaho Power Company on a PURPA agreement. We have experienced delays directly related to the Wiley application which post-dates our site's 1932 water use. These delays have already constituted a loss of income to the Snake River Pottery. The document does not mention such detriment nor does it take note of the loss of income to us which would occur if Wiley is licensed and constructed and our plant were to lose 45 ft. of head by relocation at the reservoir level.	The scope of this environmental impact statement is limited to a discussion of impacts that may occur if the proposed project or an alternative were approved by the Commission. Any impacts that may result from the mere consideration of Idaho Power Company's proposal in advance of Commission action on the application are not within the scope of this document. See Section 4.1.11.
Page 5.2, Section 5.1.1.1. (9) and (10)	
These two paragraphs refer to the inundation and relocation of the Snake River Pottery and other residences and businesses affected. Revenues lost during relocation are preemptorily mentioned in this section. No recognition is given to wear and tear, the physical and emotional drain which would almost certainly take toll of the persons involved. We, for instance, have lived and conducted our business here for 35 years and in addition to the financial loss, would suffer untold trauma if a lifetime's accomplishments and all our memories were to be drowned in a large, still reservoir.	See revised 4.1.11.1.
Idaho Power is disposed to think of people only as consumers of energy. When this company considered damming the Wiley Reach back in the fifties, they sent a survey crew onto our property while we were gone without ever asking our permission. When we returned to find red flags staked in our pasture, we went to locate the crew and find out what the flags meant. We found the surveyors in a Bliss bar where they laughingly told us they had been measuring the water level for the Idaho Power dam reservoir, and said, "It'll go right over your house."	No response required.

Though the company has certainly softened its public relations communications, it is difficult for us to forget how we were treated during the last explorations of the Wiley Reach. We suffered the pain of having Idaho Power officials, touring the valley, look out the window from our pottery studio and explain how they would put a pond where the rapids were. (and still are). "We'll make it better for you, Mrs. Bowler," were the words they used. During that period the company sent their Mr. Kinkaid (now deceased)repeatedly to get us to put a price on our property, and when we would not do that, to persuade us to join other river-front property owners and sell options on land that would be inundated to the power company.	No response required.
Then, as now, we held fast to the thought that Wiley could not....would not....be built.	Your opinion has been noted.
In conclusion, although we have spent many hundreds of hours during the past few years concerned in various ways with the Wiley project, we are grateful that we live in a nation where the rights and properties of individuals are inviolable. We have incurred many expenses and suffered income loss from having to neglect our work while we attended public meetings and, in private sessions, gathered information on alternatives to the "unavoidable adverse impacts" of the dam. We appreciate the very process in which we are now engaged and are pleased to have this opportunity, as intervenors, to reply to the DEIS.	No response required.

Respectfully submitted to be included in the Final Environmental Impact Statement For Project No. 2845.

Aldrich E. Bowler
Aldrich E. Bowler
Lilian D. Bowler
Lilian D. Bowler

Co-owners of
The Snake River Pottery

April 30, 1982

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1982 MAY -3 PM 1:16
FEDERAL ENERGY
REGULATORY COMMISSION

FERC
Attn: Kenneth R. Plumb
825 North Capitol Street, NE
Washington, DC 20426

Re: DEIS, A.J. Wiley Project, FERC No. P-2845

Dear Mr. Plumb:

Having reviewed the above-referenced document, we remain adamantly opposed to this proposed destruction of the A.J. Wiley Reach of the Snake River. Our concerns (with DEIS page numbers) are as follows.	No response required.
Page 1-1 (1.1) recognizes (barely) the devastation already inflicted by Applicant on a small geographical area which once was an hydrogeologic wonder. This DEIS should have included the cement of the Thousand Springs (now perhaps more aptly called A Dozen Springs) and Upper Salmon Power Plants in its list of hydroelectric development because these installations have certainly contributed to the environmental rape of our valley.	Your opinion has been noted.
Reduction of the generating ability of two existing plants (p. 1-1, 1.1.1) is akin to robbing Peter to pay Paul. Will this new engineering feat itself eventually be impacted by another dam downstream of Wiley? This kind of planning ahead seems typically short-sighted.	While generating ability at two of Applicant's facilities and at several small hydro sites would be reduced, the estimated net energy produced by the project during an average water year would be 485.4 GWh. (See revised Section 1.1.1, especially Table 1-1.)
If the DEIS gives figures for 1975 (p. 1-2, 1.2.1), we should have similar breakdowns for the most recent year. Has Applicant continued "sales for resale"? Rather than wholesaling energy produced here by irretrievable and irreversible environmental ruin, we would suggest Applicant cease "sales for resale" in order to use that energy in Idaho to turn cactus and sagebrush into unsaleable potatoes.	See Section 1.2.2.1. Sale for resale power is power that the Applicant is required to furnish to municipal power systems within its service area and to neighboring utilities that supply Applicant's retail customers. Sale for resale is not excess power that is sold out of the Applicant's service area, but is the firm power requirement that it must provide at wholesale cost. Most of the power sold for resale is sold to municipal power systems within Applicant's service area, such as the city of Weiser and publically owned irrigation systems. Thus, the Applicant can not reduce its load requirement by refusing to serve some of its customers.
Rather than irretrievable and irreversible ruin of the A.J. Wiley Reach, why doesn't Applicant use its full entitlement from BPA (p. 1-6, 1.2.2.2)? Why hasn't this contract been made a permanent agreement?	See revised Section 1.2.2.2.
We endorse Applicant's backhanded acknowledgement that this proposed project is not economical (p. 1-8). We do not accept the statement that time does not permit added baseload capacity, particularly when the BPA entitlement referenced above is available, and when alternatives can be more diligently pursued, and when James Bruce (President of Idaho Power) states their revised annual growth projection is 2.7% (KIVI TV, Channel 6, April 28, 1982).	No response required. Your opinion has been noted. See revised Section 1.2.4.1.

The Applicant's attitude toward conservation may be reflected in the fact that insulation jackets for water heaters are no longer available for owner-installation. We are interested and concerned that Applicant's conservation program was (note the past tense)

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POOR QUALITY PAGES

wholly concentrated on residential use when energy consumption is so much greater for irrigation and industry. What effort has been made by Applicant to increase the efficiency of the thousands of individual irrigation pumps?	
The last paragraph of 1.2.4.2 on p. 1-13 makes assumptions we question. Cheap electricity has made regional electric energy consumption almost twice the national average. Moreover, the DEIS merely states the load forecasts re ct the effects of pricing on future demand. What data were used in this generalization and was demand for increased irrigated agriculture under higher prices included?	Your opinion has been noted. See revised Sections 1.2.4.1. and 1.2.5. See revised Appendix A and Idaho Power Company 1981d.
Page 1-16 states that a deficit in supply could be met by additional generating facilities, or from purchases or exchanges. Why ruin forever a stretch of the Snake River with a plant that is not cost efficient when purchase or exchange are viable alternatives?	See revised Sections 1.2.5.2 and 1.2.5.3.
The DEIS should have given the cost of the energy produced by the projects listed in 1.3.2.1, p. 1-21 for comparison with the astronomical costs of A.J. Wiley.	Accurate costs for projects under preliminary permit are not available.
1.3.2.2 on p. 1-22 makes a broad statement about "all of the other potential hydro projects" with no substantiating evidence. What list of potential hydro projects was drawn up and by whom? Why wasn't that list included in the DEIS? When the weekly newspapers contain several applications for diversion of water for hydroelectric generation (as they have done for several years), we are skeptical about the validity of this brush-off of small hydro potential.	See revised Sections 1.3.2.1 and 1.3.2.2. The data in Section 1.3.2 are based upon FERC filings and do not rely on newspapers or water rights filings as a basis for the analysis.
1.3.3.6 on p. 1-27 indicates an exchange agreement with Washington Water Power is proposed for termination. The DEIS should have fully explained the reasons for the termination.	See revised 1.3.3.6.
We are extremely disappointed with the lackadaisical approach taken by the DEIS to the alternatives available. Some are not even mentioned (cogeneration, for example) and none are discussed in terms of environmental impacts. The 26 MW figure cited in 1.3.2.2 (p. 1-22) is considerably different from the 200 MW the IPUC has estimated as potential from small hydropower development. The whole approach toward alternatives by the DEIS and Applicant is reflected in the fact that figures for solar are not even reported in Table 1-7 (p. 1-10).	Your opinion has been noted. Cogeneration has been included in revised Section 1.2.5. See revised Sections 1.3.2.2 and 1.2.5.
The section of the DEIS dealing with Economic Comparisons of Alternative Forms of Generation is voodoo planning with deceiving data at best. The DEIS inadequately treats the costs of this project in all respects; these costs should be itemized for each feature - from solving geologic problems to building yet another new Bliss Bridge. Combining the costs of a phantom steam plant with the Bliss Bridge site is misleading; these figures should be clearly delineated.	Your opinion has been noted. See revised Sections 2.1.9.2 and 1.3.5.

The Applicant proposes recreational facilities be "oriented toward local use" (p. 2-7, 2.1.2.5). Since this Project will utterly destroy the entire nature of demonstrated "local use" of the area, it is unclear to us how "picnic units" and "playfields" are "oriented toward local use". We already have too many flatwater carp farms in this area with rarely used picnic units adjacent to them, thanks to Applicant. The concrete and steel Applicant proposes to "mitigate" the loss of local use of a natural environment will only further depredate the area and insure that locals will give it a wide berth.	Your opinion has been noted.
The ownership of land given in 2.1.2.6 (p. 2-12) should be given for the Bliss Bridge Alternate. The fact that approximately half of the land involved belongs to private citizens is given short shrift and treated with understatement later in the DEIS.	Staff believes the amount of detail is sufficient to demonstrate the extent of public and private interest and Applicant's interest in the land required. The identification of individuals is not necessary for EIS purposes.
We are concerned about the casual treatment given by the DEIS to the social problems to be expected in a boom town atmosphere. How many people is "a small group of permanent employees" (2.1.3, p. 2-13) and how realistic is "recruitment of laborers from the surrounding area"?	One or two operational workers are expected during operation of the plant. Applicant expects to recruit most of the construction workers from Twin Falls. (See Section 4.1.11.1.) A Staff telephone survey of local unions confirmed Applicant's estimates.
4.1.2.1 (p. 4-1) neglects mentioning the loss of the sound of rushing water, an adverse impact on those residents who enjoy the Wiley Reach in this respect.	Your opinion has been noted.
We believe the discussion in 4.1.3.1 (p. 4-2) conflicts with the findings of Harold Malde, USGS. Unlike Applicant's professionals, Malde (the recognized authority on hydrogeologic conditions in this area) is an impartial professional. Why have his observations been disregarded and/or discounted? Mitigative measures to prevent slumping (and the costs thereof) must be included in the EIS.	Your opinion has been noted. See Sections 4.1.3.2, 4.2.1.2, 5.2.1.5, and 1.3.5.
The top of p. 4-11 says "During this time, the A.J. Wiley Project would operate at full capacity..." At what capacity will Wiley operate all the rest of the time? Are we discussing building something that irretrievably ruins the last stretch of fast-moving river here and planning on not running it at full capacity? Forty-five per cent capacity ninety per cent of the time is an environmental rip-off, not a trade-off.	The rest of the time the project would operate to meet load requirements with the available flow. No project operates at 100 percent capacity for 100 percent of the time. Your opinion has been noted.
Both Federal and State professionals in Fish and Game should comment on the allegation that "...introduction of fingerlings one year prior to becoming catchables would reduce predation..." (p. 4-16). We find this incomprehensible.	See revised Section 4.1.5.2.
The discussion of socioeconomic factors (p. 4-32 through 4-34) is a disaster equalled by the disaster a boom town brings to permanent residents. It is utterly absurd (but oh so typical of Applicant's attitude toward conservation!) to state that 258 workers would commute from their residences within the 6-county area. With gasoline prices as they are, no day laborer is going to drive 150 miles (or more) daily. Nowhere does Applicant state	Twin Falls is 40 miles from the project and has more than 1,000 construction workers (Table 3-9). Table III-1, page III-16 of Exhibit W of the Application (Idaho Power Company, 1981b) gives the number of workers by craft. Local unions in the Twin Falls area report that they would supply all the workers needed. Immigrant workers would come from southern Idaho. Most would stay in the area during the week (rooms, trailers, and campers) and go home to Boise or Pocatello on weekends. Very few, if any, would relocate. Any who did relocate would most likely relocate in Twin Falls. See Section 3.1.9.

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POOR QUALITY PAGES

the types of workers to be employed, nor the average wage for each type. The numbers given should be categorized and "in-migrant" should be defined. Whether 130 people with the skills required currently reside in a reasonable distance of the project is highly debatable. The DEIS implies that housing for 128 people - or more, or less - is currently available in Hagerman or Bliss. The multitude of realtors in this area would be very pleased to sell temporary workers a piece of land with or without housing on it at inflated prices with high interest rates. Rental or temporary housing is another story entirely. The DEIS should have made specific assessments about the impact such an incredible influx of people would have on housing, education, law enforcement, fire protection (volunteer), health and sanitation, and social welfare services. What happens when 320 people are out of work and/or leave an area? This should have been addressed in the DEIS.	See new Section 3.1.9.5. Staff disagrees with the basic premise of your argument. See responses above.
We are interested in the following statement from p. 4-32: "Beneficial aspects of the project in addition to increased employment opportunities would be a gain in electrical power, if it is economically priced" (emphasis added). The figures previously given in this document graphically demonstrate this is NOT an economically priced project. Further, we do not consider one or two permanent new employment opportunities to be beneficial in light of all that is lost or ruined by A.J. Wiley Project.	Your opinion is noted. Employment refers to construction as well as to permanent employment.
It is a gross understatement that "...higher costs of homes and prevailing interest rates would in most cases adversely affect the individuals who were forced to relocate" (p. 4-32, 4.1.11.1). "Fair market value" doesn't begin to compensate for replacement of material goods and no compensation whatsoever is mentioned for the emotional losses involved.	See revised Sections 4.1.11.1 and 5.2.1.8.
We take exception to the statements on p. 4-59 that "Housing for construction force should be adequate" and "Public Service - should be minor impacts concentrated during construction". This is a casual write-off of potentially disastrous social impacts on small communities when there is a tremendous temporary increase in population. What would the Hagerman schools do with 30 new students and who would pay for it? The percentile increase in a town as small as Hagerman is enormous and should have been addressed in the DEIS.	See new Section 3.1.9.5 on housing and earlier responses. You are assuming all inmigrant workers with families are going to relocate in Hagerman. Staff disagrees with this assumption.
We are very concerned about the discussion on p. 5-11 (5.2.1.6) because it is barring the barn door a long time after the horse has gone to the slaughterhouse. The natural states of both Box Canyon and Malad Canyon have already been significantly altered (with further destruction planned) while the Wiley Reach remains essentially undisturbed. For FERC to suggest Applicant should "consult" with various bureaucracies to "protect" these canyons is like telling the fox to ask at the hardware store for a key to the chicken coop after he already spent the night with the hens.	Your opinion has been noted.

The A.J. Wiley Project or the Bliss Bridge Alternate would provide a new source of expensive electric energy that would result in a number of unmitigatable environmental impacts including the loss of 8 miles of fast-moving river and related whitewater recreation as well as irreversible destruction of rare riparian habitat. If FERC weighs what is ruined forever by either A.J. Wiley or the Bliss Bridge Alternate against the short-term, stop-gap, expensive energy generated, we believe the Project will be vetoed.

Please include this letter in the EIS.

Sincerely,

Daniel A. Ness

Daniel A. Ness
Friends of the Snake River
P.O. Box 28
Bliss, ID 83314

Your opinion has been noted.

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SECRETARY

May 3 3 12 PM '82

FEDERAL ENERGY
REGULATORY
COMMISSION

Box 3174
Moscow, ID 83843
April 28, 1982

Idaho Public Utilities Commission
Statehouse
Boise, ID 83720

Federal Energy Regulatory Commission
825 North Capitol, NE
Washington, DC 20426
Attention: Kenneth Plumb

Gentlemen:

Please enter this letter in the Final EIS in the public testimony on the AJ Wiley Project, Bliss, Idaho (Project No. 2845).

I object to the minimal attention paid to alternatives to the project. Moving the dam 4,000 feet, no action, or a coal-fired plant represent a very poor survey of the range of alternatives to be considered. I am not an expert on energy usage in Idaho, but it is a matter of public fact that the rate of increase of power consumption has declined in Idaho. Economic hardship is certain to further decrease the rate of consumption.	Staff considered the feasibility of various alternatives in Section 1.3 and subjected the most feasible alternatives to an economic analysis in revised Section 1.3.5. See revised Section 1.2.5.
Not having the big damsites we did previously means we will have to consider smaller, less productive sources of power. In our haste to meet projected demand, let us not commit ourselves to poor designs, poor sites, or prohibitively expensive sites. I think the Wiley dam is a combination of those three. The design commits us to the destruction of a river segment noted in the National Rivers Inventory by the National Park Service. The site had been rejected by Idaho Power previously for numerous geological problems. The stated cost, already near or exceeding coal-fired costs, does not include the extra expenses to correct the geologic problems.	Your opinion has been noted. Costs reflected in revised Section 1.3.5 include the cost to correct geologic problems.
How is it that your draft failed to even consider the resource of conservation? This resource has proven itself elsewhere in the Northwest, but has barely been tapped in Idaho. And why in an area infamous for continual, driving winds and constant sun have those resources failed to merit the attention of your draft? Private hydropower production is dramatically increasing within the state. Representatives from your San Francisco office testified over a year ago in Boise that their office was swamped with applications for small hydropower projects. Why haven't you considered that alternative?	Conservation is included as resource replacement in the load forecasts used in the evaluation of the need for power in revised Section 1.2.5, and is also discussed in revised Sections 1.2.4.1. Solar development is discussed in Section 1.3.3.4 and wind in Section 1.3.3.5. See revised Sections 1.3.2.2. and 1.2.5.

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Idaho Public Utilities Commission
Federal Energy Regulatory Commission
Page 2

I realize managing energy resources is a difficult task, but by not considering the full range of our energy alternatives, the future inhabitants of Idaho will not have been well served.

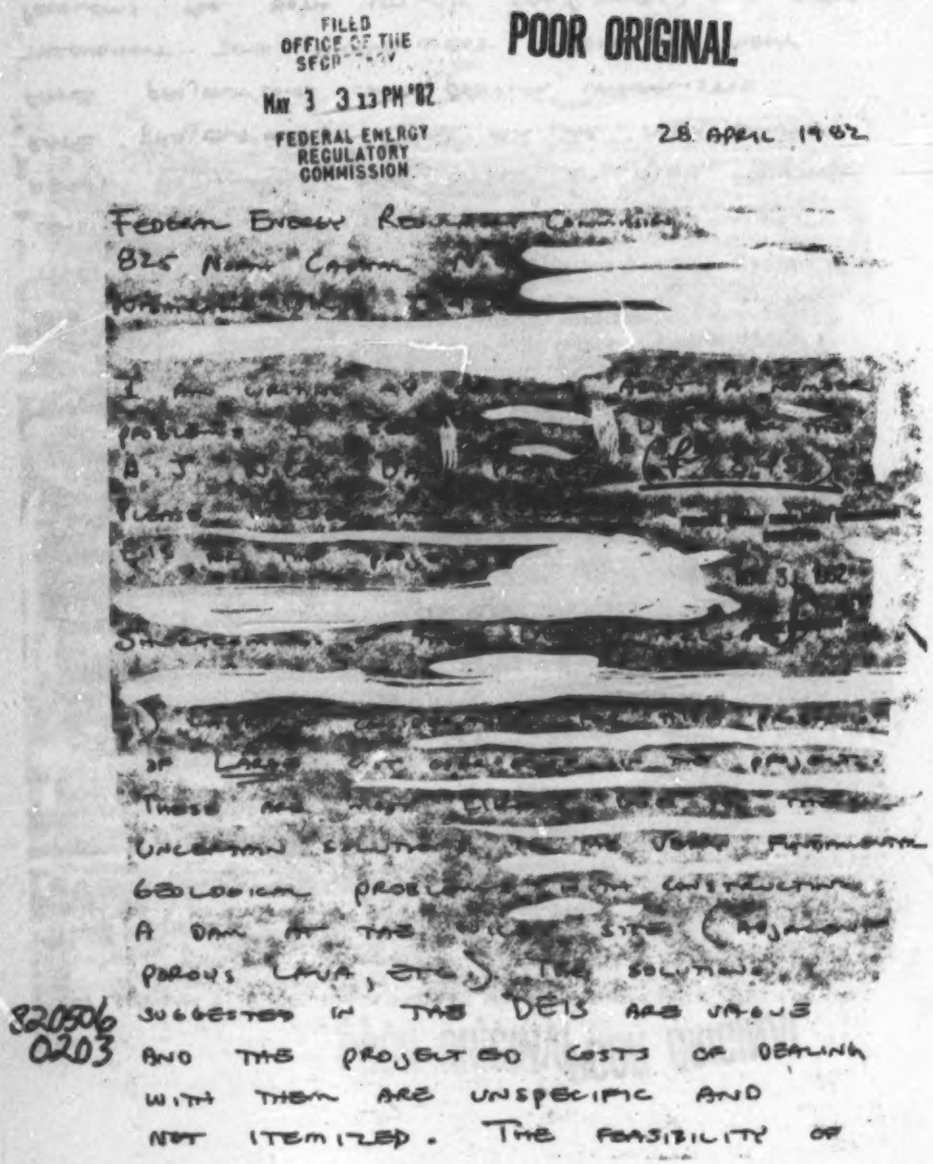
Please send me a personal copy of the DEIS. Thank you.

Sincerely,

J Casey Meredith

J. Casey Meredith

No response required.



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MAY 3 3 13 PM '82

FEDERAL ENERGY
REGULATORY
COMMISSION

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28 APRIL 1982

FEDERAL ENERGY REGULATORY COMMISSION
825 NORTH CAPITOL [illegible]
WASHINGTON [illegible]

I AM WRITING [illegible] ABOUT A NUMBER
PROBLEMS [illegible] DEIS [illegible]
A J [illegible] DAM [illegible]
PLEASE [illegible]
EIS [illegible]
[illegible]
[illegible]
OF LARGE [illegible] THE PROJECT.
THESE ARE [illegible] THE
UNCERTAIN SOLUTIONS [illegible] THE VERY FUNDAMENTAL
GEOLOGICAL PROBLEMS [illegible] CONSTRUCTING
A DAM AT THE [illegible] SITE (ADJACENT
POROUS LAVA, ETC.). THE SOLUTIONS
SUGGESTED IN THE DEIS ARE VAGUE
AND THE PROJECTED COSTS OF DEALING
WITH THEM ARE UNSPECIFIC AND
NOT ITEMIZED. THE FEASIBILITY OF

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Staff included estimated costs for the treatment of geological problems at the site to ensure that a safe and adequate project can be economically constructed. A 15 percent contingency is included in the cost estimate.

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THE PROJECT SEEMS QUESTIONABLE AND ITS [illegible] HIGH [illegible] POWER PROJECT [illegible] QUESTION [illegible] CONSIDER [illegible] THE DOES [illegible] THE PROGRAM [illegible] A TOTAL OF 2[illegible] AND THE [illegible] THE MILNER DAM PROJECT CURRENTLY UNDER CONSIDERATION. ADDITIONALLY IDAHO POWER'S NEEDS ESTIMATES ARE BASED ON HIGH GROWTH RATE PROJECTIONS. MANY SIMILAR HIGH GROWTH RATE PROJECTIONS ARE PROVING UNREALISTIC THROUGHOUT THE NORTHWEST LEADING TO MANY PROBLEMS FOR BOTH UTILITY COMPANIES AND THEIR CUSTOMERS.

Your opinion is noted.

See revised Sections 1.2.4.1 for discussions on conservation, and revised Sections 1.3.2.2 and 2.5 for discussion of small hydro development.

Revised Section 1.2.5 includes a sensitivity evaluation of load growth forecasts.

3) There is no mitigation proposal for the loss of a [illegible] 8 miles of free-flowing [illegible] time on and around the river in this area and can attest to the unique character and beauty [illegible] exist [illegible] [illegible] the [illegible] Natural Continues [illegible] to the [illegible] most [illegible] Surely this is worth more than 37.5 MW!

Your opinion has been noted.

It is my extreme [illegible] consider these comments are being applied for the Wiley Project. [illegible] a 37-86 MW project (which appears [illegible] and cost ineffective in terms of significant growth) in

Your opinion has been noted.

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Excellent [illegible] stretch of [illegible]

Idaho's [illegible] economic [illegible]

[illegible]

to the [illegible] interest [illegible]

majority of the [illegible]

[illegible]

Hope [illegible]

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[illegible]

Friends of the Snake River
P.O. Box 28, Bliss, Idaho 83314

OFFICE OF THE SECRETARY
MAY 3 3 10 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

P-2845

Commissioners:

I adamantly oppose the proposed A.J. Wiley Dam.

It is not cost-effective, and as usual its proponents have fudged the numbers and carefully ignored certain effects and costs which if included would would make the project appear so idiotic not even Congress would spend money on it.

Your opinion has been noted.

There is no particular reason for me to detail the many reasons why this dam should be constructed of papier-mache in 1/100 scale in the basement of The Corps of Engineers Barracks. They need to have their fun, too.

Your opinion has been noted.

Will there ever be a point at which these stupid rip-offs stop?

Peter Bowen

Peter Bowen
P.O. Box 2592
Boise, Idaho 83702

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FEDERAL ENERGY REGULATORY COMMISSION
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MAY 6 1982
DOCKET SECTION

TERRY MELTON 27 April, 1982

Federal Energy Regulatory Commission
825 North Capitol N.E.
Washington, D.C. 20426
Att: Kenneth Plumb

OFFICE OF THE SECRETARY
82 MAY 3 PM 4:07
FEDERAL ENERGY REGULATORY COMMISSION

Re: A.J. Wiley Project # 2845, Snake River

Dear Commissioners:

I have spoken to this issue in the past and my letter(s) are on file. Also, this letter should be included in the final EIS and report on this project.	No response required.
There are alternatives to the building of this dam. Although increased encouragement of conservation and weatherization do not seem to be a long suit of New Federalism, the potential and implementation of same could assist in the power needs. Further, the reports place little, if any emphasis, on cogeneration and waste heat resources along with the usual indifference to solar power. Also, the opportunity for Idaho Power to buy back independently produced power is still a good opportunity and a real one. This factor alone would seemingly speak to the new Federal view of increased involvement from the private sector.	See revised Sections 1.3.2.1, 1.3.2.2, and 1.3.3. Your opinion is noted.
Beyond all this, this is a precious stretch of free-flowing river. The fish, the plants and the geological formations are important. If they are gone, they are gone.	No response required.
I grew up on the banks of this beautiful canyon. It still holds a special place for those who know and love the Snake River. Keeping this run of free water is important for people and for the many plants and creatures which have no voice in your deliberations.	Your opinion has been noted.

I urge further study on this damsite and ask you to give serious considerations to the many alternatives.

Sincerely,

Terry Melton

Terry Melton
728 Rural Ave. South
Salem, Oregon 97302

c: Idaho Public Utilities Comm.

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FEDERAL ENERGY REGULATORY COMMISSION
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MAY 3 1982
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FEDERAL ENERGY
REGULATORY
COMMISSION

28 April 1982
Route 8, Box 292
Caldwell, Idaho 83605

To: The Federal Energy Regulatory Commission

Re: The Final EIS for the A. J. Wiley Project No. 2845

Please consider the following in your final determination.

I had the glorious opportunity to live in the Hagerman Valley on the Snake River between Bliss and Hagerman, Idaho. Since then I travel to that area each summer for a period of rejuvination - to read, write, swim, fish and feel the pulse of the river. From what I understand, I am not alone.	
It saddens me that a corporation has the power to remove this annual interlude from my existense, and to prohibit others from enjoying this stretch of natural beauty, too few to be found in this hum drum life. My mood is also disrupted because those who have lived on the river bank will lose their homes.	No response required.
I am particularly upset by the loss of the fish spawning areas and the sturgeon ground famed throughout the United States.	No response required.
The whole concept of a multimillion dollar corporation ruining this Snake River stretch rankles me, particularly when this corporation fails to correctly consider the geological disadvantages the Wiley Dam will afford, the disruption of the ecosystem and the failure to consider that a coal fired power plant would be less expensive to construct and would produce as much electric power.	Your opinion has been noted.
But who am I to buck a monolith, particularly on whose electric wires are plugged the governmental agencies designed to monitor the new development of dam projects with the best interests in mind for the citizen and the ecosystem?	Your opinion has been noted.

If you desire dditional comments, please contact me.

Sincerely yours,
John F. Sollers
John F. Sollers

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FEDERAL ENERGY REGULATORY COMMISSION

1502 Ellis Avenue
Caldwell, Idaho [illegible]606
April 26, 1982

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D.C. 20426

Dear Mr. Plumb,

We are strongly against the A.J. Wiley Project (Project No. 2845) and opposed to any suggestion of building a dam on the last substantial whitewater reach of the Snake River in Southern Idaho.	No response required.
This river segment qualifies as a National Natural Landmark and is vital as a Recreational River. It is also one of the most important sites in Idaho as habitats for fish and other wildlife, both faun and flora, that are nationally significant and must not be threatened.	Your opinion has been noted.
The geology of this area, when carefully studied, shows that it would be dangerous and unwise to even consider such a project as proposed in Project No. 2845. It would also prove to be far more expensive than any other alternative means of producing electricity.	See revised Sections 2.1.9.2 and 1.3.5.
If fish, wildlife, recreational and heritage values are given any worth, the slightest thought of such a project should be abandoned at once and forever.	Your opinion has been noted.
We request that our letter be included in the Final Environmental Impact Statement for the A.J. Wiley Project, Project No. 2845.	No response required.

Sincerely,

Grace N. Sollers
Grace N. Sollers

John F. Sollers Sr.
John F. Sollers, Sr.

FEDERAL ENERGY REGULATORY COMMISSION
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APR 30 1982
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Friends of the Snake River
P.O. Box 28, Bliss, Idaho 83314

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FEDERAL ENERGY REGULATORY COMMISSION

April 28, 1982

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D.C. 20426
(Attn: Kenneth Plumb)

Gentlemen:

We wish to state our opposition to the A.J. Wiley Dam on the Snake River. This is project number 2845.	Your opinion has been noted.
A major conern is the cost. Estimates of project cost have escalated, and we know that actual costs would be many times higher. It is economically unreasonable to spend over 233 million dollars to build a plant that produces electricity at 87.8 mills. We can see no justification for spending for such profligate kilowatts.	See revised Sections 1.3.5 and 5.4.
Another concern is the geological condition of the area. Porous lava does not provide a safe place for a large dam, as Dr. Malde of the U.S. Geological survey indicated in a recent study.	See Staff's response to Dr. H. Malde.
Finally, we do not believe that the electrical benefits are a sufficient reason to destroy the segment of our river that is a National Historic Landmark. How can you possibly justify doing this with a dam that is not cost effective or wanted by [illegible] people of Idaho?	The Wiley Reach has been placed on the Nationwide Rivers Inventory of potential Wild and Scenic Rivers, and has been nominated as a potential National Natural Landmark. At this time, none of the historic resources in the area have been placed on the National Register of Historic Places, although several sites have been found eligible for listing.

Yours truly,

Phyllis & Bert Burda

Phyllis & Bert Burda
5108 Wagon Wheel Rd.
Boise, Idaho 83702

Please include this letter in the final EIS for the A.J. Wiley Project (Project No. 2845).

FEDERAL ENERGY REGULATORY COMMISSION
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April 30, 1982

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FEDERAL ENERGY REGULATORY COMMISSION

FEDERAL ENERGY REGULATORY COMMISSION DOCKETED MAY 4 1982 DOCKET SECTION

Kenneth Plumb, Secretary
FERC
825 North Capitol Street, NE
Washington, DC 20426

Re: A.J. Wiley Project # 2845

Dear Mr. Plumb:

I am writing this letter to be offi[illegible] opposition to Wiley Dam. If one accepts the premise that more electric energy is needed (I do not), then Wiley Dam is the last place to even consider and only after all benign alternatives have been exhausted.

The figures given in the DEIS, across the board, are confusing and misleading. For example, the most recent growth forecast by Idaho Power is 2.7%, and this is probably wrong. As Ray Hemmingway (Oregon representative to the Northwest Power Planning Council) said on KTVB TV on April 21, 1982, "One thing we know about energy demand forecasts is that they are going to be wrong." Since the forecasts in the DEIS have already been revised downward, and since there is no mention of the impact alternate energy (like natural gas, for which daring new options for space heating are being offered including interest free loans for switching to gas) will have on electrical demand, these forecasts must be taken with a gram of salt.

I do not understand the treatment given small hydropower in the DEIS. In the last week, local papers have carried applications to divert from 10 cfs to 6000 cfs of water for electric generation. For well over a year now, the area papers have contained several such applications every week. Under these circumstances, the 26 MW figure cited in the DEIS seems more like a figure plucked from the air than one based on real data. I was very disappointed generally by the discussion of all available alternative sources of energy.

I am amazed that Idaho Power has evidently done nothing to improve the efficiency of all the irrigation pumps that are used, abused and misused. Shouldn't there be some conservation practiced in this area of major energy demand? Shouldn't this have been discussed in the DEIS?

The Need for Power section of the EIS includes a sensitivity evaluation of load growth rates in revised Section 1.2.5.

See revised Sections 1.3.2 and 1.2.5.

See revised Section 1.2.4.1.

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I am also amazed at the inadequate consideration given to the social problems created by a huge & temporary population explosion. Absent from the discussion entirely is the impact on an already-strapped social system of hundreds of people suddenly unemployed. It is highly unlikely more than a handful of these workers will purchase real estate for their sojourn here. How could Gooding County possibly cope with the economic stress of welfare & food stamp recipients to be expected out of this boondoggle?

See revised Section 3.1.9.5 and 4.1.11.1.

The DEIS recognizes there is no mitigation for losing the bit of white-water recreation this valley has left. Neither is there mitigation for losing the view from Highway 30 of this last area remnant of the Snake River as it was. I reject the suggestion that this view of the Wiley Reach really wouldn't be missed because some people wouldn't know what they were missing.

Your opinion has been noted.

Depriving generations to follow of this one last Magic Valley stretch of the sounds and sights & experiences of an un-dammed river in order to make expensive electric energy is no trade-off at all when there are alternatives.

Your opinion has been noted.

I urge the FERC to deny the licence application for Wiley & the Bliss Bridge site proposed in the DEIS.

Sincerely,

Jill Joseph
Rt. 1
Hagerman, ID 83332

IDAHO DEPARTMENT OF FISH AND GAME
600 South Walnut • Box 25
Boise • Idaho • 83707

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MAY 4 1 19 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

April 30, 1982

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, DC 20426

Re: A.J. Wiley Hydroelectric Project.
FERC No. 2845, Snake River, Idaho.
Draft Environmental Impact Statement
(DEIS).

Dear Mr. Plumb:

The referenced DEIS has been reviewed by our Department and we have the following comments:

General Comments

The alternative Bliss site, as pointed out by Federal Energy Regulatory Commission (FERC) staff, would be less damaging to fish and wildlife resources.	Your opinion has been noted.
In light of recent developments, load forecast and projected cost figures used in the draft statement may be obsolete and should be updated as necessary. Analyses that rely upon cost and load forecast figures should also be updated as appropriate.	See revised Sections 1.2.5 and 1.3.5.
Our Department is in agreement with fish and wildlife mitigation recommendations made by FERC staff. Completion of negotiations and agreement upon a final mitigation plan should be required prior to the start of project construction. We urge that this requirement be included in a license article.	No response required.
There are conflicting statements in the license application and DEIS as to daily peaking fluctuations in the reservoir. A firm, precise answer to this question will be necessary before final fish and wildlife mitigation plans can be agreed upon.	See revised Section 4.1.4.1.

FEDERAL ENERGY REGULATORY COMMISSION
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- EQUAL OPPORTUNITY EMPLOYER -

Mr. Kenneth F. Plumb
April 30, 1982
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REGULATORY
COMMISSION

Specific Comments

Page 5-10, Paragraph 1 - We concur wholeheartedly with staff's recommendation that applicant provide, perhaps indefinitely, a put-and-take catchable trout fishery in the reservoir until a self-sustaining fishery is established, if ever. This recommendation is extremely important due to the uncertainty of establishing self-sustaining populations and the time it may take to determine the success or failure of such programs. The stocking level of catchable-size trout should be sufficient to provide a harvest of at least 10,000 fish, absent contributions from any self-sustaining population.	No response required.
Page 5-10, Paragraph 1 - The staff recommendation that applicant investigate known areas with Shoshone sculpin populations for possible acquisition and protection is also supported by our Department. Any preservation efforts would have to incorporate both land ownership by applicant and protection of minimum flows by State action. The one site where these conditions appear possible of attainment by coordinated efforts between applicant and the State is Banbury Springs. We recommend that efforts towards preservation of off-site Shoshone sculpin habitat be concentrated on Banbury Springs.	See revised Section 5.2.1.4.
Page 5-8 - Staff's list of measures to be negotiated between the agencies and applicant regarding vegetative and wildlife mitigation appears reasonable. A final plan and time schedule should be agreed upon prior to the start of construction.	No response required.
Summary The staff of FERC is to be congratulated on a well-written, logical and understandable DEIS. With the exception of the reservoir pool fluctuation issue, major fish and wildlife issues appear to be well covered.	No response required.

Sincerely,

Robert M. Salter
for Jerry M. Conley
Director

cc: USFWS (Buechler)
IDPR
AG's office (Curt Burkholder)
Region 4

Page 1 of 4

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FEDERAL ENERGY REGULATORY COMMISSION

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Mr Kenneth F. Plumb
FERC
825 N. Capitol Street
Washington, D.C. 20426

Dear Mr. Plumb:

In reference to FERC No. 2845 Idaho Draft, We strongly endorse Reference Paragraph 2.4 "NO ACTION" Alternative #3, to the exclusion of all other alternatives, for the following reasons:

(1)

Table 1-11 in the above referenced material, which proposes to show a constant shortfall in energy production vs energy requirements over the next 10 years, does NOT make allowance for the approximate 30% of generation sold for resale, which procedure will ostensibly be continued. That 30% of present generation, if diverted to consumptive sale, would far more than offset the projected shortfall.

(2)

We believe the projected increase in demand is grossly inflated and unrealistic, which procedure seems to be traditionally popular within the industry, at the ultimate expense of the ratepayer. We have only to cite the ongoing experience of WPPSS who overshot in their projection by over 40%, with a resultant added expense of billions of dollars to their consumers, with absolutely NOTHING In RETURN! Is more of the same what we want for Idaho? We think not.

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MAY 17 1982
DIVISION OF HYDROPOWER LICENSING

Your opinion has been noted.

Sale for resale power is power that the Applicant is required to furnish to municipal power systems within its service area and to neighboring utilities that supply Applicant's retail customers. Sale for resale is not excess power that is sold out of the Applicant's service area, but is the firm power requirement that it must provide at wholesale cost. Most of the power sold for resale is sold to municipal power systems within Applicant's service area, such as the city of Weiser and publicly owned irrigation systems. Thus, the Applicant can not reduce its load requirement by refusing to serve some of its customers.

See revised Section 1.2.5.

(3) The actual decline in energy consumption being experienced presently in the entire Pacific Northwest, and promising to continue at an accelerated pace, further erodes the validity of their projection.	No response required.
(4) With the ever-increasing over-production in agriculture, and the increasing political emphasis on reducing subsidies in these areas, it is unreasonable to believe farmers will be stupid enough to continue increasing production or even maintaining the present level when they can't sell their backlog or current production at favorable prices, which spells "less energy". A recent report indicated, nationally, 58% of outstanding agricultural loans outstanding were delinquent, bankruptcies up dramatically! Does this suggest increasing energy demands? I think quite the contrary, that is strongly suggestive of diminishing demands.	See revised Section 1.2.5 and Appendix A.
(5) In the industrial area we have a comparable picture with growth and expansion, both domestically and internationally, once a turbulent and rowdy thing, reached its zenith a few years past. We have not been able to sustain that growth. In fact production is now down to 70% of capacity and still slipping, with no real promise of recovery in either foreign or domestic markets. Does this indicate increased energy consumption in the immediate future? Quite the contrary if one is realistic.	See Appendix A.
(6) The increasing probability of deregulation of natural gas, and the proven and known abundance of reserves,	Your opinion has been noted.

literally underwrites an additional source of energy that will significantly reduce electrical demands. Is this a time to get caught with new electrical generating facilities, operating at half capacity, and still not paid for? This is not dealt with appropriately in the projections in FERC/EIS-0031/D.	
We believe the foregoing provides abundant reason for pause. I further believe rapid improvements in the technologies in nuclear, solar, geothermal and wind utilization will make them increasingly desirable contributors in energy generation over either hydro or steam generation.	Your opinion has been noted.
By accepting Alternative #3 - "Do Nothing", until we are more enlightened as to the REAL future energy demands, and the potential input of other sources, we will gain several worthwhile rewards:	Staff disagrees. Your opinion has been noted.
(a) Avoid substantial premature rate increases, imposed by IPC to defray new plant costs (such as Valmy) which, if completed, may be operated for years below capacity, resulting in still greater costs to the consumer--another WPPSS fiasco we can do without!	
(b) Avoid irreversible damaging environmental, ecological, social and economic impacts on the area communities, until necessary, if ever!	No response is required.
(c) Inflated costs of construction of an additional generating facility 10 years down the road, if and when the	Your opinion has been noted.

F-164

need was truly validated, would be 'chicken-feed' compared to the accumulated sum of the added rates to subsidize the construction if it was begun now and not completed, or not run at full capacity when completed. Again, We urge looking at the WPPSS experience....too much, too soon!

We feel there is everything to be gained, and nothing to lose, in exercising our prerogative to wait for further clarification and valid enlightenment on the issues involved, in the best interests of the consumers of Idaho, instead of Idaho Power Company.

Respectfully,

C. Earle Joseph
Mary E. S. Joseph

C.E. & Mary E.S. Joseph
Rt. 1, Box 254
Hagerman, ID 83332
Tel: (208) 837-4851

FEDERAL ENERGY REGULATORY COMMISSION
MAY 6 9 46 AM '82

Please enter this into the official record.

Your opinion has been noted.

CENTRAL FILES

OFFICE OF THE SECRETARY
MAY 10 1 29 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

Federal Energy Regulatory Comm.
825 N. Capitol, NE
Washington, D.C. 20426
Attn: Ken Plumb

5-5-82

Re: A.J. Wiley Dam Project-
#2845-Snake River

Dear Mr. Plumb:

I am writing as an Oregon attorney, fisherman, ornithologist, and conservationist who is opposed to the ill-advised Wiley Dam. The Draft EIS has insufficient alternatives, and a full range of integrated or combined alternatives are not considered. Conservation is not considered.

See revised Section 1.2.4.1.

The project is not cost effective. The area has geological problems that will increase costs much higher than now estimated. Geological costs are not itemized, nor for any other project features, including mitigation.

See revised Section 1.3.5.

There is not inadequate analysis and data on geological problems, and "acceptable levels of leakage are not defined.

Staff disagrees. Your opinion has been noted.

MAY 13 1982
DIVISION OF HYDROPOWER LICENSING

Most serious, mitigation is proposed not at all, for the loss of whitewater recreation, fish spawning habitat, threatened plants and animals, and rich riparian habitat with birch groves and giant hackberry. Prime sturgeon habitat and raptor sites would be lost.

See revised Section 5.2.

The site is the sixth most significant in the state, according to a Fish & Wildlife Service survey. The river here has been found to qualify for Natl. Landmark, and be considered a Recreational River under the Wild & Scenic River Act.

I will support legal action to challenge the final EIS if anything but the "No Action" alternative is selected.

Sincerely,
Jeffrey Crook
27691 SE Haley
Boring, Or 97009

29 PM
COMMISSION

cc - Idaho Public Utilities Comm.
Statehouse
Boise, Id. 83720

The Wiley Reach has been placed on the Nationwide Rivers Inventory of potential Wild and Scenic Rivers, and has been nominated as a potential National Natural Landmark.

No response required.

F-167

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OFFICE OF THE
SECRETARY
MAY 11 3 51 PM '82
FEDERAL ENERGY
REGULATORY
COMMISSION

1416 Juniper Hill Rd.
Pocatello, Idaho 83204
May 7, 1982

Federal Energy Regulatory Commission
825 N. Capitol, N.E.
Washington, D. C. 20426

Att: Kenneth Plumb

Dear Sir:

This letter is to register my protest against the proposed A. J. Wiley Dam Project (#2845) on the Snake River in southern Idaho. I don't see how this project, at an estimated cost of 233 million dollars, could ever pay its way. And cost overruns on similar projects lead me to suspect that this figure is low. The estimate has already jumped from 128 million dollars when Wiley was first proposed a couple of years ago.

See revised Summary and Sections 1.3.5 and 5.4.

The trade-off of a relatively minor stop-gap amount of power in place of the recreational and tourist attractions that the area now provides seems a poor bargain to me—even if we consider only the economic part of the problem and disregard the environmental degradation that is unavoidable. (We are already having trouble maintaining minimum quality habitat, including ppm of oxygen, for fish and other wildlife on the southern reaches of the Snake.)

Your opinion has been noted.

Sincerely,

Jean Elle

Jean Elle

cc Idaho Public Utilities Commission
State House
Boise, Idaho 83720

Governor John Evans
State House
Boise, Idaho 83720

RECEIVED
MAY 13 1982
DIVISION OF HYDROPOWER
LICENSING

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

Received
5-18-82

MAY 14 1982

ER-82/413

Mr. Kenneth F. Plumb, Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20412

Dear Mr. Plumb:

We have reviewed the draft environmental impact statement for A. J. Wiley Project, FERC No. 2845, Twin Falls and Gooding Counties, Idaho, as requested. In conducting our review, we have noted omissions and deficiencies which should be corrected before the license is issued. Where applicable our comments have been organized into general and specific concerns and separated by sections or page numbers.	No response required.
GENERAL COMMENTS	
Our Fish and Wildlife Service (FWS) and the Idaho Department of Fish and Game (IDFG), while not opposed to this project, have had reservations concerning the mitigation plan for fish, wildlife, and vegetative resources as presented in Idaho Power Company's (IPCo) license application. As a result and at the request of the Federal Energy Regulatory Commission (FERC), the FWS and IDFG jointly submitted a general mitigation plan which provides more equitable compensation for the natural resource losses. We have met with the applicant since that time but none of the mitigation plan differences have been resolved. The important points are:	No response required.
1. A comprehensive mitigation plan, including the FERC staff recommendations, should be negotiated and agreed to among the applicant, FWS, and IDFG. The final mitigation plan should be approved by all parties prior to initiating project construction. We recommend that this request be incorporated in a license article.	Staff agrees.
2. We reiterate the need for in-kind replacement of riparian and wetland vegetation. If the replacement amount cannot be met on-site, IPCo should improve other IPCo project areas off-site. Improving habitat along either Upper or Lower Salmon Falls Reservoirs has been recommended by the FWS and IDFG.	Your opinion has been noted. Staff is concerned that replacement refers not only to quantity of vegetation lost, acre per acre, but also to the quality of vegetation--species diversity and composition.
3. Loss of Shoshone sculpin, a candidate species for listing as threatened or endangered, and its habitat should be compensated. We recommend preservation of Banbury Springs by the applicant as compensation for the Shoshone sculpin and as partial mitigation for the loss of existing natural values at the proposed project site.	The Idaho Department of Fish and Game and Idaho Power Company are currently negotiating an agreement with respect to a conservation flow to protect Shoshone sculpin at Banbury Springs.

4. The FWS assumes that daily water level fluctuations will range from two to five feet. Establishment of like-quality riparian and wetland vegetation on-site do not appear likely with these fluctuations unless mitigation measures include the use of irrigation systems and subimpoundments.

See revised Section 4.1.4.1, 4.1.4.6., and 5.2.1.3. Quantitative impacts in the upper part of the proposed reservoir would have to be considered prior to finalizing the mitigative plan.

SPECIFIC COMMENTS

Page 1-21, Section 1.3.2, Hydroelectric Alternatives. The information contained in this section appears to be incomplete. Several major and minor projects are not listed in the table on page 1-22. In the general vicinity of the A. J. Wiley Project (Gooding, Jerome and Twin Falls Counties), approximately fifteen hydroelectric exemption applications and ten preliminary permit applications have been filed with the FERC. Most of these are on tributaries and springs of the Snake River in the Thousand Springs area.

See revised Sections 1.3.2.1 and 1.3.2.2.

Recreation Resources. It is stated on page 2-12 that recreational facilities would be constructed and operated by the applicant for two of the six areas with the potential for future expansion and "the applicant proposes to review the need for additional development at five-year intervals based on use of the existing facilities." The statement does not specify which two areas the applicant is responsible for, nor does it define whose responsibility it would be to develop the remaining four areas. The recreation plan should include a schedule of development and specify who is responsible for the development and maintenance of such facilities.

The discussion of proposed recreation facilities also does not define a mechanism for determining the need for additional development of recreation facilities. The statement on page 2-12 merely indicates that the applicant will review the need for additional development at 5-year intervals based on the use of existing facilities. Monitoring recreation use at the project should be part of such a mechanism, yet no system for collecting user statistics is proposed. The process should be described and any such review of recreation development needs should be closely coordinated with the appropriate local, State and Federal agencies. We recommend that it include a predetermined level of use which will result in additional development of facilities.

See revised Section 2.1.2.5. The plan for recreational development was included as Exhibit R in the Application for license (Idaho Power Company, 1981b), and was incorporated by reference rather than repeated in the EIS. Applicant would be responsible for the construction, operation, and maintenance of the proposed recreational facilities. The two areas where Applicant has determined that expansion could take place would be at Shoestring Road and the Malad River confluence. Recreational use would be monitored in cooperation with the appropriate agencies. Expansion would be indicated when campgrounds and day-use areas were occupied at over 95 percent capacity for at least 20 days of any calendar year, excluding 3-day weekends.

Cultural Resources. It is stated on page 3-45 that the Idaho State Historic Preservation Officer (SHPO) has reviewed the applicant's archeological reports and has concurred with the staff on the eligibility of these sites for the National Register. However, supporting documentation of the SHPO's finding is not included. A copy of the SHPO's letter should be included in the final environmental statement, documenting the applicant's findings. Supporting documentation from the Idaho SHPO is also needed concerning the statement on page 3-61 which indicates that there are no properties currently on or eligible for the National Register of Historic Places in the vicinity of the potential plant location.

The remaining historic sites identified in the initial archeological survey (table 3.7) are apparently not eligible for the National Register of Historic Places but, again, this should be documented by the Idaho SHPO. Please see title 36 Code of Federal Regulations Part 800 "Protection of Cultural and Historic Properties." Fourteen prehistoric and historic sites would be unavoidably impacted by the recreation of Wiley Reservoir (page 4-31). It is stated on page 4-31 that:

This appendix documents the SHPO's opinion on the eligibility of inventoried sites for the National Register and on the adequacy of the proposed mitigative measures. Mitigative measures have not been discussed for several sites because investigations have not been completed to determine eligibility for the National Register and the nature of project impacts at these sites. Staff has requested that the Applicant complete the eligibility determinations and a management plan to avoid or mitigate impacts to these sites. Staff intends to consult with the Advisory Council on Historic Preservation concerning project impacts to eligible properties for the National Register, and to provide a detailed management plan for the Council's review.

".....the applicant has proposed data-recovery measures to mitigate adverse impacts to three sites (those which appear eligible for the National Register of Historic Places) and a detailed program of salvage excavation would be undertaken to record the significant information present at sites 10GG1 and 10TF352."	
The data-recovery measures and the program of salvage excavation are not discussed in detail, and mitigation measures for several sites have not been proposed.	
Mitigation measures should be clearly defined and discussed in detail. Any plans to mitigate the loss of cultural resources should also be coordinated with the Idaho SHPO.	
National Natural Landmarks and Wild and Scenic Rivers. The DEIS adequately describes the impacts of the project on potential National Natural Landmarks and Wild and Scenic Rivers (page 4-25).	Staff notes that since the publication of the DEIS, the Wiley Reach has been included on the Nationwide Rivers Inventory. The EIS has been revised accordingly.
Water Resources. The last paragraph on page 4-5 does not match other available information. Presently the water level fluctuations vary up to 3 feet but are generally less. The addition of the Wiley Project would not decrease the fluctuations but increase them to about 2 to 5 feet. This was indicated in the applicant's permit and license applications. This fluctuation is critical when attempting to establish riparian and wetland vegetation within the project area.	See revised Sections 4.1.4.1.
The FWS has asked IPCo for its peaking operation schedule but has received no response. FWS has therefore assumed a 2 to 5 foot fluctuation in order to make mitigation recommendations.	No response required.
The statement needs to address the effects on dissolved oxygen caused by the impoundment. The assessment, as stated on page 4-12, is very general. What would be the expected dissolved oxygen levels with development? We recommend an appropriate temperature study be performed to address stratification and predict possible dissolved oxygen levels.	See revised Sections 4.1.4.1 and 5.2.1.3.
The potential for algal blooms in the proposed reservoir resulting in effects on recreation, fisheries and waste assimilation is mentioned (page 4-15, paragraph 3). The anticipated severity or significance of these effects and possible mitigation measures should be discussed.	See revised Section 4.1.4.1, 4.1.5.1 and 5.1.1.2.
We also recommend that an evaluation of the proposed project's ability to pass the probable maximum flood be included in the final statement.	See revised Section 2.1.2.1.
Fish and Wildlife Resources. Page 4-16, Section 4.1.5.3, Unavoidable Adverse Impacts. Please add to item four (4), eight miles of white sturgeon rearing habitat would be lost.	See revised Section 4.1.5.3.

Page 4-25, first paragraph. Dr. J. S. Griffith, Idaho State University, surveyed for Shoshone sculpin in the Wiley Reach during July and August of 1981. He found eight populations ranging from a few dozen to several hundred. His analysis of project impact was that these eight separate populations would not be expected to survive (Griffith 1981).	See revised Section 4.1.7.3.
Page 4-25, last paragraph. Please delete the last sentence. The quality of waterfowl hunting is typically lower in reservoir situations than on free-flowing portions of the Snake River.	See revised Section 4.1.8.1.
Page 4-36, fourth paragraph. The Bureau of Land Management (BLM) wildlife management area would not be inundated, but could be adversely affected by the proposed road location, which apparently would be constructed through a wetland area. The last paragraph on this page should, therefore, discuss the possibility of routing the road across the top of the dam.	See revised Section 4.2.2.1.
Page 4-57. Insert 86 acres of woody riparian habitat under Vegetation - Proposed Action, A. J. Wiley Project. The acreage of wetlands lost for Alternative I, Bliss Bridge Site should be stated.	See revised Table 4-5 for woody riparian acreage. According to the Applicant's vegetation map there are no wetlands above the Bliss Bridge. Staff has recommended in Section 5.2.1.1 that if the project is licensed, the Applicant should conduct a thorough, on-the-ground survey to determine the number of acres and the location of all the vegetation types in the proposed project area.
Page 5-3, Section 5.1.2. The FWS prefers this construction alternative because it affects less habitat.	No response required.
Page 5-4, Section 5.1.3. The coal-fired alternative should be more fully explored with the Idaho Public Utilities, if it would eliminate or reduce future major projects inundating free-flowing water, especially riffle areas, on the Snake and other rivers in the State.	No response required.
Page 5-6, Section 5.2.1, Vegetation, Item Numbers 3, 4, 5, and 6. We have the following comments on items 3, 4, 5, and 6 of the staff recommended vegetation mitigation plan.	
(3) An in-kind replacement rate for riparian and wetland habitat need not exceed 1.25 acres.	Your opinion has been noted.
(4) We agree that strip riparian vegetation replacement would be more beneficial to wildlife than a block design, provided the strips are of sufficient breadth.	Staff agrees.
Where possible, on-site, linear reestablishment of woody riparian habitat should be pursued. In view of water level fluctuations, planted riparian areas should be irrigated either using a pump system or gravity flow from incoming springs and streams. The type of irrigation used will be site specific. The planted areas should be fenced in areas where grazing may occur.	Staff agrees.
(5) A report on the success of the various planting efforts should result. This would be a useful reference for analysis of future projects and, possibly, management of IPCo impoundments.	Your comment has been noted.

(6) We request that a comprehensive mitigation plan that includes the mentioned goals as well as a working time table be agreed upon among the applicant and the resource agencies before project construction can commence. We would like this request to be incorporated in an article of the license.	Staff agrees.
Page 5-8, second paragraph, Wildlife. IPCo has two other projects in the general vicinity of the A. J. Wiley site (Dike Project, FERC No. 2846 and Kanaka Rapids Project, FERC No. 3477) which currently have preliminary permits. We have encouraged IPCo to conduct terrestrial Habitat Evaluation Procedures (HEP) on these projects. Our FWS suggests that a HEP for all three projects can be done at the same time. On the Wiley site, the HEP process could be scaled-down to focus on riparian and wetland habitat. We would like the HEP to be used for pre- and post-project habitat value assessment which would include an assessment of the success of mitigation efforts in the future. This could involve conducting a HEP in five and fifteen years after project completion. Funding for the HEP analaysis should be incurred by IPCo.	Your opinion has been noted. Staff believes a habitat evaluation method would be a useful monitoring technique. Your opinion has been noted.
Page 5-8, third paragraph. We request that the mitigation measures be negotiated and agreed to among the applicant, the FWS and the IDFG prior to project construction. We are in agreement with the staff recommended negotiable wildlife mitigation measures except for the following comments on items 1, 4, 5, 8, and 9.	Staff agrees.
(1) The FWS and IDFG have suggested that twenty-four small islands be constructed and seeded to a grass/legume mixture. If the site of the dam is moved to above the Bliss bridge this number can be reduced since a large island with several nesting pairs of Canada geese and other waterfowl will not be affected by the project.	Your opinion has been noted.
We agree with IPCo (refer to their letter to FERC concerning IDFG/FWS mitigation plan) that the primary emphasis of their waterfowl mitigation plan should be to establish "quality waterfowl habitat." However, IDFG frequently will stock areas with wildlife species in order to advance the establishment rate. The FWS feels that the applicant has the responsibility to attempt this also on their project lands as partial mitigation for the loss of resident waterfowl and the hunting recreation associated with them.	Your opinion has been noted.
(4) The FERC and the applicant should be aware that such a survey will have to encompass more than one season. A survey of breeding birds and other wildlife should be conducted as well as a winter survey of upland game birds and waterfowl.	Staff agrees.
(5) We suggest annual reports on the post-construction monitoring of mitigation measures.	Staff believes that post-construction monitoring reports are needed.
(8) If the applicant agrees to a 1.25:1 replacement loss ratio of riparian habitat and manages the mitigation areas to improve habitat quality, then loss of upland game species and their habitat will be satisfactorily mitigated.	Your opinion has been noted.
(9) We would like to see such a time schedule agreed upon among resource agencies and the applicant prior to project construction. The time table should be a part of the comprehensive mitigation plan.	Staff agrees.

Page 5-10, Section 5.2.1.3, Fisheries. We agree with IPCo that a working definition of a "self-sustaining fishery" is needed. This problem can be handled through negotiations.	No response required.
Shoshone sculpin habitat is under increasing adverse pressure due to hydroelectric and aquaculture development in its restricted range. FWS Endangered Species staff have met with IPCo to discuss FWS concerns and possible mitigation measures that could be implemented to safeguard key Shoshone sculpin populations.	The Idaho Department of Fish and Game and Idaho Power Company are currently negotiating an agreement with respect to a conservation flow to protect the Shoshone sculpin at Banbury Springs.
There are three important Shoshone sculpin habitat sites on which minimum stream flow applications have been filed by the State of Idaho. They are Box Canyon, Banbury Springs and Briggs Springs. There are also water right filings for hydropower and aquaculture development in these areas. We recommend that efforts be made to preserve the Banbury Springs site as compensation for the lost sculpin habitat as well as partial compensation for other losses caused by the project.	See revised Section 5.2.1.4.
Page 5-11, Protection of Malad and Box Canyons. We share the concerns over the effects of the project on recreational and natural values as expressed by FERC staff and agree in principle with the findings on page 5-11. We would be pleased to consult with the applicant and the Idaho Department of Fish and Game and Parks and Recreation in the protection of Malad Canyon and Box Canyon. We recommend that, in any license issued, an article to this effect be included.	Your opinion has been noted.
Page 5-11, third paragraph, Banbury Springs. We feel that IPCo can and should protect Banbury Springs from future hydroelectric, aquaculture or any other development that would degrade fish and wildlife habitat and the aesthetic beauty of the area.	See revised Section 5.2.1.4.
Page 5-14, Section 5.3, Unmitigatable environmental impacts. Please add the statement that eight miles of white sturgeon rearing habitat will be lost.	See revised Section 5.3.1.
CONCLUDING REMARKS We agree with most of the recommendations made by the FERC staff. It is clear that they recognize the value of riparian and wetland communities along the Snake River. In-kind compensation is needed for the loss of these natural resources. We are willing to meet with the applicant and other resource agencies at any time to develop a comprehensive mitigation plan for the wildlife, fishery, and other natural resources. We request that the plan be developed and agreed to among all parties before project construction begins.	No response required.

Sincerely,

Bruce Blanchard, Director
Environmental Project Review

cc: Mr. Fred Springer
Idaho Power Company

POOR ORIGINAL

[illegible]
P. O. Box [illegible]
Berkeley, Calif. [illegible]

May 5, 198[illegible].

Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D.C. 20426
Attention: Mr. Kenneth Plumb.

Dear Mr. Plumb:

[illegible]

[illegible]

Sincerely,

[illegible]

POOR ORIGINAL

Your opinion has been noted.

Your opinion has been noted.

F-174

Bonneville County Sportsmen's Association

COMMISSION

IDAHO FALLS, IDAHO

13 May 1982

Mr. Kenneth Plumb
Federal Energy Regulation Commission
825 North Capitol, N.E.
Washington, D. C. 20426

Dear Mr. Plumb:

The Bonneville County Sportsman's Association is a fifty year-old conservation organization whose membership is composed of several thousand men and women from east Idaho. The organization has received state-wide and national recognition for its efforts in fish and game habitat improvement, and has raised and released thousands of fish and game-birds at the organization's expense.	No response required.
The following statement should be made part of the file on the proposed A. J. Wiley Dam (Project #2045); it is made by the Board of Directors of the BCSA on behalf of the membership.	
The A. J. Wiley project is another in a series of proposed hydroelectric projects for the Intermountain West.	
Like so many hydroelectric projects, it is (per the draft Environmental Impact Statement) an ill-conceived and poorly considered project and we oppose it for the following reasons:	Your opinion has been noted.
1) There is no apparent cost advantage of power produced by Project #2045 compared to comparable fossil (coal) fired plants.	See revised Section 1.3.5.
2) We, in Idaho Falls, have felt the cataclysmic terrors of a dam failure (from the Teton Dam in 1976). Both Wiley sites have serious geological inconsistencies making them unsuitable for dam erection without extensive and extremely costly structural fixes. This is enough justification to stop this project!	Your opinion has been noted.
3) Again we see a significant and unreplaceable recreation resource proposed for destruction to generate electrical power, and no efforts or expense is committed to mitigate these losses! This stretch of river, if flooded, would inundate an area that qualifies as an official National Landmark and has the	Your opinion has been noted.

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potential to join the Salmon, the Rogue and other Scenic and Wild Rivers when so classified.

We are, by and large, native Idaho citizens and not practised nor expert in combing-through and analyzing E. I. S. The above deficiencies cited are so obvious to us that any objective appraisal of Project #2845 will concur with ours, and the Wiley Dam Project cancelled.

Very truly yours,

M. F. Huebner, Secretary
Bonneville County Sportsmen's Association

MFH:kk

No response required.

Idaho Environmental Council

Idaho Falls, Idaho 83401

OFFICE OF THE SECRETARY
MAY 17 2 09 PM '82
FEDERAL ENERGY REGULATORY COMMISSION

CENTRAL FILES

May 12, 1982

Kenneth Plumb, Secretary
Federal Energy Regulatory Commission
825 N. Capitol St., N.E.
Washington, D.C. 20426

[illegible] Wiley Project, FERC-2845

Dear Mr. Plumb;

These are our comments on the draft EIS for the proposed A. J. Wiley Project. I apologize for being somewhat late with them, and hope that they will be given serious consideration.	No response required.
The A. J. Wiley Project would be highly destructive. We urge the FERC to deny the license application.	Your opinion has been noted.
On page 4-65, the draft EIS summarizes the trade-offs involved: "Although the project would provide a new source of electric capacity and energy to meet the future energy demand in the service area, it would result in a reduction of net productivity (loss of riparian vegetation and associated wildlife) and an overall reduction of the diversity and quality of environmental resources and values now found in the 20-mile reach of the Snake River between Bliss dam and the Upper Salmon Falls dam."	No response required.
The continued reduction of biological diversity is a very serious problem, world-wide and nationwide. Indeed, some knowledgeable people consider destruction of natural habitats, and the subsequent loss of genetic and species diversity, to be one of the very worst things our species is responsible for. (See Richard Pough, "The Need for Species Diversity", in the December, 1961 issue of Defenders of Wildlife magazine.)	No response required.
The draft EIS indicates on page 4-64 that the "Irreversible and Irretrievable Commitment of Resources" of the project include the following: "Inundation of land by the project reservoir would preempt the current use of this land for river fishing, hunting, agriculture, business, and small hydropower production; this action would constitute an irretrievable commitment of these resources for the life of the project. Inundation of this land would also eliminate regionally scarce riparian vegetation and associated wildlife that currently utilize this habitat."	No response required.
"The project would also inundate an 8-mile reach of the Snake River. Populations of aquatic plants and animals dependent on the flowing nature of the river would be reduced or eliminated."	No response required.

THIS DOCUMENT CONTAINS POOR QUALITY PAGES

FEDERAL ENERGY REGULATORY COMMISSION
DOCKETED
MAY 17 1982
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Impacts

The significant environmental impacts of the construction and operation of the proposed A. J. Wiley Project are well summarized on pages 5-1 through 5-3. These impacts include:

• The loss of 8 miles of free-flowing Snake River and associated aquatic habitat.	No response required.
• The loss of important and unusual riparian habitat and associated wildlife species. "The riparian vegetation would not reestablish with the previous diversity of species and 'strip' type of growth that now exists along the shoreline of the Wiley Reach."	No response required.
• Loss of scientific research and educational opportunities to study aquatic and terrestrial species and ecosystems endemic to the Wiley Reach, and restricted to Idaho.	No response required.
• Loss of upland game hunting opportunities and dispersed recreational use of the river environs.	No response required.
• Loss of the last significant fast, whitewater reach of the Snake River in southwestern Idaho, with attendant loss of whitewater boating opportunity and loss of a commercial rafting operation. Whitewater boaters would have to travel clear to the Salmon River to find a comparable whitewater experience.	No response required.
• Loss of the existing rainbow trout fishery.	No response required.
• Loss of private property, including 4 homes, a business, a gravel operation, and 3 small powerplants.	Small powerplants could be relocated above proposed reservoir elevation.
• The degradation of water quality, including increased heat, sediment, and nutrients in the reservoir, leading to the production of algal blooms, and to the reduction of dissolved oxygen downstream.	No response required.
• The potential for seepage through the subsurface pillow lavas leading to possible dam failure.	No response Required.
Riparian Habitat. Less than 0.6 of one percent of the land area in Idaho contains riparian vegetation such as is found in the project area (p 3-29). Not only are some of the species unusual, but the diversity of species is high. The National Science Foundation study of 1980 in the project area identified 152 species of riparian vegetation, indicating a far greater diversity than along the adjacent Lower Salmon Falls Dam impoundment, where only 54 species were identified.	The correct statement is "Less than 0.6 percent of the land area in Idaho contains riparian vegetation such as is found in the project area"-- not less than 0.6 of one percent of the land. See Section 3.1.4.1.
The draft EIS points out on page 4-24 that "Although the Applicant has proposed a riparian vegetation mitigative plan, approximately 91 acres of woody riparian habitat, 18 acres of herbaceous riparian habitat, 12 acres of wetland habitat, 200 acres of grass/shrub habitat, and the associated wildlife species and their productivity would still be unavoidably lost."	No response required.

Species of Concern. The summary of significant environmental impacts on pages 5-1 through 5-3 includes the loss of scientific research and educational opportunity to study species endemic to the area, but it should also include the impact of the project upon the species themselves. The EIS does discuss the 5 candidate Threatened and Endangered species (page 3-34); Shoshone sculpin, Snake River snail, the 2 species of milk-vetch, and the fleabane. The general discussion of impacts does indicate (page 4-25) that the project would reduce, but probably not eliminate, habitat for the sculpin and the snail. However, habitat reduction for these species might be quite significant.

A species which is not proposed for T&E status, but which is of concern to many of us, including the Idaho Fish & Game Department, is the white sturgeon. The draft EIS doesn't say much about it, other than to say on page 3-27 that the white sturgeon population in the Wiley Reach is severely depressed, citing the Idaho Fish & Game studies by Lukens and Cochnauer in 1980 and 1981. It is important to remember that the Lukens report does not say that the Wiley Reach is not sturgeon habitat, but rather than the population is severely depressed because of the construction of the 3 Idaho Power Company Dams in the area in the 1940's and 1950's and because of over-fishing prior to 1970. In fact, this report says that sturgeon habitat does remain, and that the unique springs on the north side of the River furnish optimum water temperature and constant food supply for sturgeon.

The habitat of this once-anadromous animal has been greatly reduced. This is especially true in the Snake River, where the numerous dams, including several built by the Applicant, have destroyed most of the free-flowing stretches of Snake River needed by the sturgeon, and have land-locked them. The loss of any more of the remaining sturgeon habitat has become critical, including the Wiley Reach. The EIS should discuss this point, and should include loss of white sturgeon habitat in the list of impacts of Section 5.1.1.

Mitigation

The Idaho Fish & Game Department, the U.S. Fish & Wildlife Service, and the FERC have found the Applicant's mitigation plan for vegetation, wildlife, and fisheries inadequate. In general, we would support mitigation proposed by those agencies (if the Dam were built) as far as they go, but in addition, we support the mitigation plan proposed by Dr. Peter Bowler on pages 49 through 58 of his letter of April 27, 1982 to FERC commenting upon the draft EIS.

Discussing mitigation for such a destructive project as a major dam poses a bit of a paradox for those trying to save the free-flowing river. If the dam is built, and there has not been much support for significant mitigation, then the constructing entity is more likely to be able to avoid significant mitigation. On the other hand, continued focus on mitigation may tend to give the impression that the project would not be so terribly unpalatable with mitigation, and that those discussing mitigation are not strongly opposed to the project. Please do not interpret our remarks in this manner. Mitigation in a case like this would be like having an assailant pay part of your hospital costs after breaking your arm.

See revised sections 4.1.7.1 and 5.1.1.1.

Your opinion has been noted.

Your opinion has been noted.

Your opinion has been noted.

No response required.

See revised Section 5.1.1.

Your opinion has been noted.

No response required.

Water Quality

The discussion of mitigation of water quality reduction on page 5-10 would apply only to the construction phase of the project. There is apparently not much that could be done to mitigate anticipated degradation of water quality from operation of the project, with one very important exception which comes to mind. That is, the maintenance of at least 6 PPM of dissolved oxygen released at the dam should be written into the licence, and Idaho Power Company should not be allowed to weasel out of this obligation like they did at American Falls Dam. That shameful episode, produced by a combination of Idaho Power lobbying, a compliant Idaho Legislature, and an emasculated EPA, has left a bitter taste in the mouths of many people in southern Idaho.

See revised Sections 4.1.4.1 and 5.2.1.3.

Drawdown

A feature of the operation of Wiley Dam mentioned on page 5-3 is that "Fluctuations in reservoir levels over short periods of time would result in erosion and sedimentation impacts on shoreline recreational use." On page 1-1, the statement of purpose and need for the action indicates that the project is "to operate as a run-of-the-river plant with minimal daily and weekly reservoir fluctuations to provide for regulation of power output and peaking operations." This raises the question of how much the reservoir would fluctuate. If the project would be operated as anything other than a run-of-the-river plant, with drawdowns daily of more than, say 2 or 3 feet, then this would have an impact on shoreline vegetation and on aquatic food chains at the reservoir margins; if so, then these impacts should be discussed in the EIS.

See revised Sections 4.1.4.1, 4.1.6.1, and 5.2.1.3.

Geology and Dam Safety

On page 4-5, it says that "Excessive seepage through permeable McKinney Pillow lava in the right abutment could cause piping (internal erosion) to occur in adjacent portions of the earth-fill embankment." Under mitigation, on page 5-10, there is a summary of FERC staff recommendations on constuction of a subsurface cut-off ot prevent this seepage from the reservoir into and beneath the dam. If the dam is built, this should certainly be an integral part of constuction. As I recall, piping was involved with the failure of the Teton Dam in 1976, and we should have learned something from that disaster.

See revised Section 2.1.9.2, 1.3.5, Summary, and Staff Conclusions. Your opinion has been noted.

Alternatives

The range of alternatives considered is not adequate. The Bliss Bridge Damsite alternative would produce roughly similar impacts to Wiley. The coal-fired plant near Bliss would also be undesirable to many southern Idahoans. Since Idahp Power Company has already built 3 dams within a few miles of the proposed project area, as well as developments on several springs, it seems that enough environmental degradation in the interests of electrical energy production has already occured in this area.

Staff believes that all of the reasonable alternatives to the proposed project have been addressed.

One alternative which might be considered is the possibility of Applicant building another unit at, or proceeding a year earlier with, their share of the plant they are building jointly with another utility in Nevada. Using Idaho Power Company's projected annual increase rate of 3.9%, Staff concluded (page 1-16) that the Wiley Project would not preclude the need for more generating plants.

No plants exist where such additions are not already assumed in the resource projections. Decisions to proceed with or delay construction are based on numerous factors, including finance, economics, and need for power, and are not within the scope of the Commission's purview.

The projected growth rate of 3.9% per year in electrical consumption is itself questionable. Hopefully, it is way too high. A recent BPA analysis, for the Pacific Northwest as a whole, projects something less than half of that rate.

Conservation is not given enough consideration. One area where there may be potential for significant savings is in increasing the efficiency of irrigation pumps, a large summer-time source of demand. Another aspect which raises questions about Applicant's seriousness over conservation, is their recent lobbying effort in the Idaho Legislature to get them to overturn the Idaho PUC's inverted rate structure.

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Loss of Free-Flowing Rivers

The Snake is an important river. In recent decades, it has been intensively developed. There are about 23 dams on the main stem alone. Although not all of them are large or impound reservoirs, still all together they do impound over 300 linear miles of the Snake's 1000 mile length, with a disproportionately higher fraction at the lower and middle stretches.

Public awareness is only starting to recognize the damage caused by the spree of dam-building of recent decades on the Columbia and Snake Rivers. The National Research Council Supporting Paper 8, "Energy and the Fate of Ecosystems" (part of a study of nuclear and alternative energy systems) says:

> "Damming of rivers for hydropower does more damage to ecosystems than any other presently discussed source of energy. Only one type of habitat is in imminent danger of being eradicated in the United States by energy-related activities -- free-flowing, wild rivers. Our few remaining scenic and free-flowing rivers or stretches of rivers should be preserved." (page 386)

The Wiley Stretch of the Snake River certainly fits into this category. Because of its outstanding natural values, it has been recommended for inclusion in the National Wild & Scenic Rivers System, and also as a National Natural Landmark. The U.S. Fish & Wildlife Service has ranked it as the 6th most significant site in Idaho in their survey of "Important Fish and Wildlife Habitats in Idaho".

It can no longer be assumed that every proposed electrical generating plant is automatically in the public interest. Wiley Dam is not. Please deny the license for it.

The conclusions on page 5-15 of the draft EIS provide a good summary:

> "The Snake River in Idaho has been extensively developed for irrigation and electrical energy, especially in the past 30 years. The large-scale hydroelectric development of the Wiley Reach would result in the commitment of one of the last significant remnants of the free-flowing Snake River in south-central Idaho. The relatively undeveloped Wiley Reach provides ecological, cultural, and recreational benefits that are scarce or unique regionally, and may be of national significance. In addition to a rare and unique riparian flora and the associated diversity of wildlife, the free-flowing Wiley Reach supports aquatic resources that are limited in their distribution in south-central Idaho."

Sincerely,

Jerry Jayne
Jerry Jayne
IEC Board

See revised Section 1.2.5.

See revised Sections 1.2.4.

No response required.

No response required.

The Wiley Reach has not been recommended as a National Wild and Scenic River, although its potential has been demonstrated by inclusion on the Nationwide Rivers Inventory.

Your opinion has been noted.

No response required.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

REPLY TO ATTN OF: M/S 443

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Draft EIS

May 20 9 41 AM '82
FEDERAL ENERGY REGULATORY COMMISSION

Mr. Kenneth F. Plumb
Secretary
Federal Energy Regulatory Commission
825 North Capitol Street, NE
Washington, D.C. 20426

ATTN: Mr. Thomas N. Russo

RE: A. J. Wiley Hydroelectric Project
FERC Project # 2845

Dear Mr. Russo:

The Environmental Protection Agency has completed reviewing the Draft Environmental Impact Statement (DEIS) for the Idaho Power Company's (IPC) proposed A.J. Wiley Hydroelectric Project on the Snake River in Idaho. EPA's principal concerns regarding the project and the DEIS are water quality related.

No response required.

The DEIS notes that "... the water quality data indicate that the Snake River is a eutrophic system; the degree of eutrophication ...is not apparent in the Wiley Reach because water velocities are high." [DEIS, page 3-19]. High ammonia concentrations, warm temperatures, and high pH values have caused the concentration of toxic unionized ammonia (NH_3) to exceed 0.02 mg/l, the lower limit of toxicity for fish and aquatic life in the Wiley Reach [DEIS, page 3-22]. Orthophosphate (PO_4-P) concentrations in the reach have all exceeded the maximum criterion set to prevent algal blooms [DEIS, page 3-24; citing EPA data].

No response required.

Given these conditions, the DEIS' limited treatment of the proposed project's potential impacts on water quality [page 4-11 et. seq.] needs to be expanded for the Final EIS. Development of a quantitative analysis of potential water quality impacts supported by mathematical modeling is warranted. Mathematical modeling would insure that there is a reasonable and acceptable degree of certainty associated with the Final EIS' predictions of water quality impacts. This evaluation should:

See revised Section 4.1.4.1.

1. Indicate whether construction or operation of the project would, either separately or in conjunction with existing nearby hydroelectric projects on the Snake River, cause, contribute to, or aggravate any violations of water quality standards. The evaluation should reflect seasonal effects, low flows, the loss of reaeration resulting from the project, and worst case situations. Parameters of particular concern include nutrient, suspended sediment, dissolved oxygen, and dissolved nitrogen concentrations; turbidity levels; and water temperatures.

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2. Address the frequency and magnitude of spills and the potential for nitrogen supersaturation. Since the spillway will be part of the construction diversion structure, the potential for nitrogen supersaturation during construction should also be evaluated.	
3. Develop and evaluate possible mitigation measures designed to reduce the frequency and severity of any water quality standards violations.	See revised Section 5.2.1.3.
EPA supports the recommendation of the FERC staff that the applicant prepare a detailed plan to control soil erosion, dust, and slope stability to minimize the quantity of potential water pollutants resulting from project construction and operation. The plan should address road alignment; construction and maintenance; spoil disposal and material sites; and the reservoir shoreline.	No response required.
Based on these factors EPA has rated this EIS LO-2 [LO: lack of objections; 2: insufficient information]. We appreciate the additional time which you have given us for this review to compensate for its late arrival at this office. Should you care to discuss our comments, Mr. Dick Thiel, our Environmental Evaluation Branch Chief, may be contacted at (206) 442-1728 or (FTS) 399-1728.	No response required.

Sincerely,

John R. Spencer
Regional Administrator

cc: Idaho Operations Office

F-184

CALIFORNIA STATE UNIVERSITY
LONG BEACH

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FEDERAL ENERGY
REGULATORY
COMMISSION

May 18, 1982

Kenneth Plumb
Federal Energy Regulatory Commission
825 North Capitol, N.E.
Washington, D. C. 20426

Dear Mr. Plumb:

I have recently learned of the plans for the A. J. Wiley Dam (Project No. 2845), and I am deeply disturbed by the thought of losing that beautiful stretch of the Snake River by Bliss. I have fished that particular stretch, rafted it, and swum it, and I do not believe that--at this late date in our historical misuse of the environment--we can afford to lose another section of the Snake River without a fuller study of the impact such a dam project would have on all users of the river and on the ecology of the Snake itself.

Your opinion has been noted.

I have been particularly interested in the past with bird and animal life in that area of the Snake. On several birding trips I have observed dozens of species that would be displaced or destroyed if this project went through. This area is rich in bird life, and that life lives easily with the thousands of people who each year raft and fish that area. In fact, this is one of the last stretches of the river where this kind of natural ecological harmony exists. I don't believe that the Environmental Impact Study has adequately addressed the question of what we would lose in natural life if this project went through. I do believe that this stretch of the Snake River should be preserved as it is so that all of us can enjoy and use its beauty.

Your opinion has been noted.

I hope that the concerns of this letter will be contained in the final EIS on this project.

Sincerely,

David R. Peck
David R. Peck
Professor
English/CSULB

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